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Title of Invention: _____

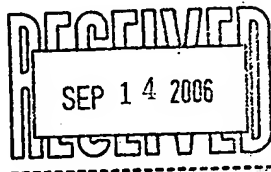
Inventors (please provide full names): _____

Earliest Priority Filing Date: 6/19/2000

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See clm 26.

→ Jeanne Horrigan previously Researched Case in
July 30 2004.



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File 155:MEDLINE(R) 1950-2006/Sep 20
 (c) format only 2006 Dialog
 File 5:Biosis Previews(R) 1969-2006/Sep W3
 (c) 2006 The Thomson Corporation
 File 73:EMBASE 1974-2006/Sep 21
 (c) 2006 Elsevier B.V.
 File 94:JICST-EPlus 1985-2006/Jun W2
 (c) 2006 Japan Science and Tech Corp(JST)
 File 144:Pascal 1973-2006/Aug W4
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 (c) 2006 NTIS, Intl Cpyrght All Rights Res
 File 8:Ei Compendex(R) 1970-2006/Sep W2
 (c) 2006 Elsevier Eng. Info. Inc.

Set	Items	Description
S1	11869	(ANAEROBIC OR LACTATE OR LACTIC()ACID)()THRESHOLD? ? OR ON-SET(1W)BLOOD() (LACTATE OR LACTIC()ACID)()ACCUMULATION
S2	33731	(LACTIC()ACID OR LACTATE) (2N) (ACCUMULAT? OR CONCENTRAT????)
S3	9990290	RATE? ? OR KINETICS OR DYNAMICS
S4	9296731	TIME
S5	11443409	MEASUR??? OR MEASUREMENT? ?
S6	11426319	DETERMIN??? OR CALCULAT?
S7	13609474	FORMULA? ? OR EQUATION? ? OR MODELL??? OR MODEL???
S8	4316527	STRESS OR EXERT??? OR EXERCIS??? OR EFFORT? ?
S9	331	S1 AND S2(S)S3(S)S4
S10	3233	S5(5N)S2
S11	1594	S6(5N)S2
S12	267	S7(5N)S2
S13	3415	S8(5N)S2
S14	119	S9 AND S10:S13
S15	0	S14/2001
S16	1	S14/2002
S17	11	S14/2003
S18	3	S14/2004
S19	7	S14/2005
S20	6	S14/2006
S21	91	S14 NOT S16:S20
S22	41	RD (unique items)
S23	41	Sort S22/ALL/PY,A
S24	110	S5()S2

S25	47	S6()S2
S26	44	S7(1N)S2
S27	11	S1 AND S24:S26
S28	11	S27 NOT S14
S29	5	RD (unique items)
S30	281	S10:S12 AND S1 AND S3:S4
S31	244	S8 AND S30
S32	2604	S3(5N)S2
S33	741	S4(5N)S2
S34	68	S31 AND S32:S33
S35	65	S34 NOT (S14 OR S27)
S36	29	RD (unique items)
S37	2	S36/2001
S38	1	S36/2002
S39	4	S36/2003
S40	2	S36/2004
S41	1	S36/2005
S42	0	S36/2006
S43	19	S36 NOT S37:S41
S44	19	Sort S43/ALL/PY,A

23/7/2 (Item 2 from file: 155)

DIALOG(R)File 155:MEDLINE(R)

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05621585 PMID: 7298427

Exercise recovery above and below anaerobic threshold following maximal work.

Stamford B A; Weltman A; Moffatt R; Sady S

Journal of applied physiology- respiratory, environmental and exercise physiology (UNITED STATES) Oct 1981, 51 (4) p840-4, ISSN 0161-7567--
 Print Journal Code: 7801242

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The purpose of this study was to **determine** the effects of resting and **exercise** recovery above [70% of maximum O2 uptake (VO2 max)] and below [40% of VO2 max] **anaerobic threshold** (AT) on blood **lactate** disappearance following maximal **exercise**. Blood **lactate concentrations** at rest (0.9 mM) and during **exercise** at 40% (1.3 mM) and 70% (3.5 mM) of VO2 max without preceding maximal **exercise** were **determined** on separate occasions and represented base lines for each condition. **The rate of blood lactate disappearance from peak values was ascertained** from single-component exponential curves fit for each individual subject for each condition using both the **determined** and resting base lines. When **determined** base lines were utilized, there were no significant differences in **curve** parameters between the 40 and 70% of VO2 max recoveries, and both were significantly different from the resting recovery. When a resting base line (0.9 mM) was utilized for all conditions, 40% of VO2 max demonstrated a significantly faster half **time** than either 70% of VO2 max or resting recovery. No differences were found between 70% of VO2 max and resting recovery. It was concluded that interpretation of the **effectiveness of exercise recovery above and below AT** with respect to blood **lactate** disappearance is influenced by the base-line blood **lactate concentration** utilized in the calculation of exponential half times.

Record Date Created: 19820120
Record Date Completed: 19820120

23/7/7 (Item 7 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)
(c) 2006 The Thomson Corporation. All rts. reserv.
0005195316 BIOSIS NO.: 198682041703
CHANGES OF CARDIOVASCULAR SYMPATHOADRENAL AND METABOLIC RESPONSE DURING EXERCISE CORRESPONDING TO LACTATE THRESHOLD OF MIDDLE-AGED AND ELDERLY WOMEN
AUTHOR: YOSHITAKE Y (Reprint)
AUTHOR ADDRESS: DEP HYGIENE, SCH MED, EHIME UNIV, EHIME**JAPAN
JOURNAL: Japanese Journal of Hygiene 40 (6): p867-875 1986
ISSN: 0021-5082
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: JAPANESE
ABSTRACT: The present study discusses the usefulness of **Lactate Threshold** (LT) as a health indicator in carrying out an **exercise** program for middle-aged and elderly women. The subjects were 16 middle-aged and elderly women aged 38 to 58 years (mean \pm SD = 41 \pm 7 years). In order to **measure** LT and **Onset of Blood Lactate Accumulation** (OBLA), study the change of sympathoadrenal response in relation to changes of cardiovascular and metabolic responses, and examine changes of sympathoadrenal, cardiovascular and metabolic responses during 60 mins of **exercise** corresponding to LT, submaximal **exercise** tests were performed by the subjects. The results obtained were as follows: Heart **rate** (HR) and systolic blood pressure (SBP) at LT were 120 \pm 14 beats/min and 144 \pm 24 mmHg, whereas at OBLA 153 \pm 12 beats/min and 171 \pm 20 mmHg, respectively. Plasma noradrenaline significantly increased above the HR level of 150 beats/min. And a significantly relationship was found among the noradrenaline, SBP, pressure- **rate** product and **lactic acid** (LA). During 60 mins of **exercise** corresponding to LT, LA attained a peak level of 2.01 \pm 0.93 mmol/l at 10 min, and thereafter gradually decreased. On the contrary, there was a progressive increase in plasma free fatty acid and glycerol indicating an increase in lipolysis. Noradrenaline and adrenaline increased 50% and 90% respectively above the resting levels at 60 min, at which **time** values of HR and SBP were 126 \pm 21 beats/min and 134 \pm 23 mmHg respectively. In conclusion, it was suggested that LT is a superior indicator in terms of safety and efficiency for **exercise** prescriptions for middle-aged elderly women.

23/7/8 (Item 8 from file: 73)
DIALOG(R)File 73:EMBASE
(c) 2006 Elsevier B.V. All rts. reserv.
03708810 EMBASE No: 1988158246
Aerobic capacity, anaerobic threshold and cold exposure with speed skaters
Quirion A.; Therminarias A.; Pellerei E.; Methot D.; Laurencelle L.; Tanche M.; Vogelaere P.
Department des Sciences de l'Activite Physique, Universite du Quebec, Trois-Rivieres, Que. G8Y 3E5 Canada
Journal of Sports Medicine and Physical Fitness (J. SPORTS MED. PHYS. FITNESS) (Italy) 1988, 28/1 (27-34)

CODEN: JMPFA ISSN: 0022-4707

DOCUMENT TYPE: Journal

LANGUAGE: ENGLISH SUMMARY LANGUAGE: ENGLISH

During a maximal **effort** performance test of short duration at 0degreeC, we have observed that the plasma **lactate concentration** at max V.O_{inf} 2 is lower than the value obtained during the same cycling **exercise** at 20degreeC. In light of these results it is of interest to **determine** if the **anaerobic threshold** measured using various lactic acid values occurs at the same relative power output whether it is assessed in a cold or in a neutral thermic environment. Five speed skaters from the junior and senior team of France were tested during maximal cycle ergometer pedalling in a climatic chamber at 0degreeC and 20degreeC. The continuous stepwise incremental **exercise** protocol consisted of an initial 3 min work bout at 50 watts, followed by a 50 watt increment every 3 min to the limit of the subjects' tolerance (exhaustion). **Measurements** of gaz variables were made at rest and at the last minute of each work steps. Blood samples were collected at rest and thereafter during the last 15 s of each 3rd min, and at the 1st, 4th, 7th and 10th min post-**exercise** from an antecubital vein through an indwelling catheter for subsequent analysis of **lactate concentration**. **Determination** of % max V.O_{inf} 2 corresponding to the **anaerobic threshold** was assessed at a blood **lactate concentration** of 4 mmol/l. Under thermal equilibration (20degreeC), the **onset** of anaerobiosis occurred 73.5% of the maximal oxygen uptake. V.O_{inf} 2 and V.e values at the **onset** of the **anaerobic threshold** were 2.90 +/- 0.41 l-minsup -sup 1 and 143 +/- 28.50 l-minsup -sup 1, respectively. Under cold conditions, the **onset** of anaerobiosis occurred at approximately the same relative power output (72% max V.O_{inf} 2). Although max V.O_{inf} 2 is significantly higher under cold conditions than it is under a warmer environment, the V.O_{inf} 2 value at the **threshold** is not significantly different than the one **measured** under the warmer environment (3.61 +/- 0.72 l-minsup -sup 1). Heart **rate** is identical in both conditions and V.e is more high in cold. Below the **threshold** workrates, blood **lactate concentrations** are identical under both cold and thermal equilibrium conditions. **For workrates above the threshold, the blood lactate concentration increase under cold stress seems less in comparison to the accomplished pedalling exercise under thermal equilibrium.** We then noticed that hyperventilation is more important and the RQ is lower. We can conclude that the effect of cold exposure above the **anaerobic threshold** is to decrease the blood **lactate concentration**, increase to V.O_{inf} 2max, no change in **exercise time** and power output.

23/7/9 (Item 9 from file: 155)

DIALOG(R)File 155:MEDLINE(R)

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08324605 PMID: 2628359

Lactate, oxygen uptake, and cycling performance in triathletes.

O'Toole M L; Douglas P S; Hiller W D

Department of Orthopaedic Surgery, University of Tennessee-Memphis 38163.

International journal of sports medicine (GERMANY, WEST) Dec 1989, 10

(6) p413-8, ISSN 0172-4622--Print Journal Code: 8008349

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

To assess the relationship of **exercise** test variables to each other and to bike race **times** in an ultra-distance triathlon, we studied 24 participants (14 men, 10 women) in the 1985 Hawaii Ironman Triathlon, using a graded, maximal cycle ergometer test with gas exchange and blood **lactate** (LA) **measurements** at each work load. **Exercise** test variables were oxygen uptake (VO₂) and heart **rate** (HR) at the **lactate** and ventilatory **thresholds**. **Lactate threshold** (LT-1) was defined as the **exercise** intensity that elicited a 1 mM increase in blood **lactate concentration** above the value **measured** during the first work load for each subject. Variables were also examined at the **lactate thresholds** of 2 mM and 4 mM. Ventilatory **thresholds** (VT) were identified as the points at which the ventilatory equivalent of oxygen (VE/VO₂) increased without a corresponding increase in the ventilatory equivalent of carbon dioxide (VE/VCO₂). Mean peak oxygen uptake (peak VO₂) for this sample of Ironman triathletes was 57.4 ml.kg⁻¹.min⁻¹. Cycle peak VO₂ was inversely correlated, $r = 0.68$ (P less than 0.0002) with bike finish **time**. VO₂ and HR as well as the respective percentages of maximum were higher at all **lactate thresholds** than at VT (P less than 0.0001). Therefore VT should not be used to identify a **lactate threshold** in ultra-endurance triathletes. VO₂ values at the **lactate** and ventilatory **thresholds** were not highly related to bike finish **time** ($r = -0.26$ to -0.58). Fractional utilization of peak VO₂ (% peak VO₂), HR, and % peak HR at **thresholds** were not related to bike finish **time** ($r = -0.01$ to 0.06). (ABSTRACT TRUNCATED AT 250 WORDS)

Record Date Created: 19900425

Record Date Completed: 19900425

23/7/10 (Item 10 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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08244364 PMID: 2583172 Record Identifier: 90060096

Blood lactate responses in incremental exercise as predictors of constant load performance.

Orok C J; Hughson R L; Green H J; Thomson J A

Department of Kinesiology, University of Waterloo, Ontario, Canada.

European journal of applied physiology and occupational physiology (GERMANY, WEST) 1989, 59 (4) p262-7, ISSN 0301-5548--Print

Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Other Citation Owner: NASA

Record type: MEDLINE; Completed

Seven trained male cyclists (VO₂max = 4.42 +/- 0.23 l.min⁻¹; weight 71.7 +/- 2.7 kg, mean +/- SE) completed two incremental cycling tests on the cycle ergometer for the estimation of the "individual **anaerobic threshold**" (IAT). The cyclists completed three more **exercises** in which the work **rate** incremented by the same protocol, but upon reaching selected work **rates** of approximately 40, 60 and 80% VO₂max, the subjects cycled for 60 min or until exhaustion. In these constant load studies, blood **lactate concentration** was **determined** on arterialized venous ([La-]av) and deep venous blood ([La-]v) of the resting forearm. The av-v **lactate** gradient across the inactive forearm muscle was -0.08 mmol.l⁻¹ at rest. After 3 min at each of the constant load work **rates**, the gradients were +0.05, +0.65* and +1.60* mmol.l⁻¹ (* P less than 0.05). The gradients after 10 min at

these same work rates were -0.09, +0.24 and +1.03* mmol.l⁻¹. For the two highest work rates taken together, the lactate gradient was less at 10 min than 3 min constant load exercise (P less than 0.05). The [La]_{av} was consistently higher during prolonged exercise at both 60 and 80% VO₂max than that observed at the same work rate during progressive exercise. At the highest work rate (at or above the IAT), time to exhaustion ranged from 3 to 36 min in the different subjects. These data showed that [La] uptake across resting muscle continued to increase to work rates above the IAT. Further, the greater av-v lactate gradient at 3 min than 10 min constant load exercise supports the concept that inactive muscle might act as a passive sink for lactate in addition to a metabolic site.

Record Date Created: 19900110

Record Date Completed: 19900110

23/7/12 (Item 12 from file: 155)
DIALOG(R) File 155:MEDLINE(R)
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08624006 PMID: 2242751

The relation between cycling time to exhaustion and anaerobic threshold.

Aunola S; Alanen E; Marniemi J; Rusko H
Rehabilitation Research Centre of the Social Insurance Institution,
Turku, Finland.

Ergonomics (ENGLAND) Aug 1990, 33 (8) p1027-42, ISSN 0014-0139--
Print Journal Code: 0373220

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

This study investigated whether the anaerobic threshold (AnT) could be used to predict prolonged work capacity measured as cycling time to exhaustion (= endurance time) and which factors, in addition to relative exercise intensity, could explain variation in endurance time. Theoretical exercise intensities corresponding to certain endurance times were also calculated. The hyperbolic and exponential functions between cycling time and relative work rate (WR[%]), as well as between cycling time and relative oxygen uptake (VO₂[%]) were fitted to the pooled data (n = 45) of 17 subjects. The WR(%) and VO₂(%) were expressed as a percentage of the subject's own AnT- and maximum-values. At WR corresponding to AnT (i.e., 70% of WR_{max}) an average subject could cycle 60 min according to both AnT- or maximum-related exponential function. When prediction was done for an endurance time of 4 h, the AnT-related exponential function gave 2.9%-units (= 11 W or approximately 0.15 O₂ l.min⁻¹) lower intensity level (51% of WR_{max}) than the maximum-related function (54% of WR_{max}). The WR(%) alone explained 54% and 70% of the variation in endurance time of the AnT-related and maximum-related exponential functions, respectively. Muscle fibre composition and initial blood lactate or relative muscle glycogen depletion (change in muscle glycogen as percentage) increased significantly the explanatory power of these models. The differences between the observed and expected exercise times correlated with blood lactate accumulation (r = -0.42; p less than 0.01), muscle fibre composition (r = 0.33; p less than 0.05) and relative muscle glycogen depletion (r = 0.67; p less than 0.01). It was concluded that the capacity for prolonged work measured as cycling time to exhaustion can be estimated by AnT-related power output, and that

the exponential function **model** is the most suitable. Prediction power of the **model** can be improved by multiple regressions including muscle fibre composition, initial blood **lactate** level and relative muscle glycogen depletion.

Record Date Created: 19901228

Record Date Completed: 19901228

23/7/13 (Item 13 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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08508170 PMID: 2369904

Blood lactate during constant-load exercise at aerobic and anaerobic thresholds .

Oyono-Enguelle S; Heitz A; Marbach J; Ott C; Gartner M; Pape A; Vollmer J C; Freund H

Centre de Recherches Nucleaires, IN2P3-CNRS/Universite Louis Pasteur, Strasbourg, France.

European journal of applied physiology and occupational physiology (GERMANY, WEST) 1990, 60 (5) p321-30, ISSN 0301-5548--Print

Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Venous blood **lactate concentrations** [lab] were **measured** every 30 s in five athletes performing prolonged **exercise** at three constant intensities: the aerobic **threshold** (Thaer), the **anaerobic threshold** (Than) and at a work **rate** (IWR) intermediate between Thaer and Than. **Measurements** of oxygen consumption (VO2) and heart **rate** (HR) were made every min. Most of the subjects maintained constant intensity **exercise** for 45 min at Thaer and IWR, but at Than none could **exercise** for more than 30 min. Relationships between variations in [lab] and concomitant changes in VO2 or HR were not statistically significant. Depending on the **exercise** intensity (Thaer, IWR, or Than) several different patterns of change in [lab] have been identified. Subjects did not necessarily show the same pattern at comparable **exercise** intensities. Averaging [lab] as a function of relative **exercise** intensity masked spatial and temporal characteristics of individual curves so that a common pattern could not be discerned at any of the three **exercise** levels studied. The differences among the subjects are better described on individual [lab] curves when sampling has been made at **time** intervals sufficiently small to resolve individual characteristics.

Record Date Created: 19900820

Record Date Completed: 19900820

23/7/14 (Item 14 from file: 8)

DIALOG(R) File 8:Ei Compendex(R)

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03412130 E.I. Monthly No: EIM9204-015161

Title: Lactate kinetics and oxygen delivery in exercising rats.

Author: Caraway, D. L.; Gainer, J. L.

Corporate Source: Univ of Virginia, VA, USA

Conference Title: 1991 Annual Fall Meeting of the Biomedical Engineering Society

Conference Location: Charlottesville, VA, USA Conference Date: 19911012
E.I. Conference No.: 15576
Source: Annals of Biomedical Engineering v 19 n 5 1991. p 581
Publication Year: 1991
CODEN: ABMECF ISSN: 0090-6964
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 9204

Abstract: The dependence of oxygen consumption, metabolism, and **exercise** endurance on oxygen delivery was investigated using rats, which were chronically catheterized then progressively **exercised** while gas exchange was monitored and blood was sampled for analysis. The **kinetics** of $\dot{V}O_2$, as $\dot{V}O_{2\max}$ changed were well described by a **threshold model** selected after a statistical comparison to a continuous model), and the **lactate threshold** (LT, the transition point where **lactate** begins to **accumulate** in the blood) occurred at 55% of maximal oxygen consumption ($\dot{V}O_{2\max}$). These results indicate that, during **exercise**, **lactate accumulation** and oxygen consumption **dynamics** are similar in both magnitude and time course to that observed in man. The effect of exogenous **lactate** on endurance was investigated by continuous infusion of **lactic acid** to achieve elevated, steady-state arterial levels. It was found that endurance was inversely related to the **rate** of added **lactate**. In addition, there appears to be a critical **lactate concentration** (approximately equals 8 mmol/l) above which, fatigue rapidly ensues. This implies that **lactate** may metabolically or symptomatically limit endurance capacity. Evidence also suggests that a strong link exists between **lactate accumulation** and oxygen availability to tissue. Oxygen delivery was manipulated experimentally by hypoxia, hyperoxia and by infusion of compounds which are thought to alter oxygen diffusivity. When oxygen delivery was increased (by any method) $\dot{V}O_2$ for any given $\dot{V}O_{2\max}$ was lower, $\dot{V}O_{2\max}$ was higher and the LT occurred at a greater percent of $\dot{V}O_{2\max}$ than controls. When the oxygen delivery was reduced, **lactate accumulation** was increased and $\dot{V}O_{2\max}$ reduced. The results are consistent with the hypothesis that oxygen delivery may be diffusion limited and may influence **lactate** production during **exercise**. (Author abstract)

23/7/16 (Item 16 from file: 94)
DIALOG(R) File 94:JICST-EPlus
(c)2006 Japan Science and Tech Corp(JST). All rts. reserv.
01686323 JICST ACCESSION NUMBER: 92A0830919 FILE SEGMENT: JICST-E
Objective Assessment of Functional Capacity in Patients with Chronic Heart Failure: Normal Values of Oxygen Consumption($\dot{V}O_2$) at Peak Exercise and Anaerobic Threshold in Normal Sedentary Subjects.
MATSUI SHINOBU (1); TAMURA NOBUKI (1); MATOBA MUNETOSHI (1); FUKUOKA TAKUMI (1); MATSUMOTO MASAMITSU (1); TAKEKOSHI NOBORU (1); MURAKAMI EIJI (1)
(1) Kanazawa Medical Univ.
Kanazawa Ika Daigaku Zasshi(Journal of Kanazawa Medical University), 1992, VOL.17,NO.3, PAGE.309-316, FIG.6, TBL.4, REF.15
JOURNAL NUMBER: Z0020BAY ISSN NO: 0385-5759
UNIVERSAL DECIMAL CLASSIFICATION: 616-073:612-087
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: Objective assessment of functional capacity in patients with

heart disease is useful not only in **determining** severity and prognosis, but also evaluating the effects of therapy. It is known that resting hemodynamic **measurements** are of little value in the assessment of functional capacity. Although the **measurement** of cardiac output at maximal **exercise** can provide the best indication of the heart's ability to respond to increased demand, its **measurement** is technically very difficult. Oxygen consumption (VO₂) can be easily **measured** using an automatic, real- **time** and on-line expired gas analyzer. VO₂ has a good correlation with cardiac output, and so, maximal oxygen consumption (VO₂max) has been considered one of the most reliable indices of functional capacity. The highest VO₂ that can be maintained during prolonged **exercise** without **accumulation** of **lactate** was termed the **anaerobic threshold** (AT) by Wasserman et al. Recently, AT was introduced as an index to evaluate functional capacity in patients with heart failure. The present study was conducted to evaluate the functional capacity in patients with heart failure using the cardiopulmonary **exercise** test. Initially, the normal values for various parameters obtained by the cardiopulmonary **exercise** test, especially, VO₂ at peak **exercise** and AT, were defined in our laboratory. Methods: Eighty-three healthy subjects (47 men, 36 women), leading sedentary lives, participated in this study. The average age was 41.±.13 (range, 18-66) years. An electromagnetically controlled cycle ergometer was used. The **exercise** protocol was the symptom-limited ramp **exercise** test. After a 2-minute rest on the ergometer, **exercise** began with a 3-minute warm-up at 0 watt, followed by 15-watt incremental loading every minute. Blood pressure was **measured** non-invasively every 1 minute. ECG and heart **rate** were monitored. (abridged author abst.)

23/7/17 (Item 17 from file: 155)
DIALOG(R) File 155:MEDLINE(R)
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09439518 PMID: 1450988

[Relation between the change of slope of heart rate and second lactic and ventilatory thresholds in muscular exercise with large load]

Relation entre le changement de pente de la fréquence cardiaque et les seconds seuils lactique et ventilatoire au cours d'un **exercice** musculaire à charge croissante.

Ahmaidi S; Varray A; Collomp K; Mercier J; Prefaut C
Service d'Exploration Fonctionnelle Respiratoire, Hôpital Aiguelongue, Montpellier, France.

Comptes rendus des séances de la Société de biologie et de ses filiales (FRANCE) 1992, 186 (1-2) p145-55, ISSN 0037-9026--Print

Journal Code: 7505439

Publishing Model Print

Document type: Journal Article ; English Abstract

Languages: FRENCH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The **time**-course of heart **rate**, blood **lactate**, and ventilatory gas exchange was studied during an incremental **exercise** test on cycloergometer in order to ascertain whether heart **rate** deflection occurred at the same load as the second **lactate** S[La]₂ and ventilatory (SV₂) **thresholds**. Twelve moderately trained subjects, 22 to 30 years old, participated in the study. The initial power setting was 30 W for 3 min with successive increases of 30 W every min except at the end of the test where the increase was reduced

to 20 and 10 W.min⁻¹. Ventilatory flow (VE), oxygen uptake (VO₂), carbon dioxide production (VCO₂, ventilatory equivalents of O₂ (EO₂ = VE/VO₂) and CO₂ (ECO₂ = VE/VCO₂), and heart rate (HR) were **determined** during the last 20 s of every min. Venous blood samples were drawn at the end of each stage of **effort** and analyzed enzymatically for **lactate concentration** ([La]). The HR deflection, S[La]₂, and SV₂ were represented graphically by two investigators using a double blind procedure. Following the method proposed by Conconi et al. 1982, the deflection in HR was considered to begin at the point beyond which the increase in work intensity exceeded the increase in HR and the linearity of the work **rate** /HR relationship was lost. S[La]₂ corresponded to the second breaking point of the **lactate time-course curve** (**onset of blood lactate accumulation**) and SV₂ was identified at the second breaking point in the increase in VE and ventilatory equivalent for O₂ uptake accompanied by a concomitant increase in ventilatory equivalent for CO₂ output. We observed that the deflection point in HR was present only in 7 subjects. The work load, VO₂, HR, and [La] levels at which heart **rate** departed from linearity did not differ significantly from those **determined** with S[La]₂ and SV₂. The VO₂ and HR values at HR deflection point were significantly correlated with those **measured** at S[La]₂ and SV₂. It is concluded that deflection in heart **rate** does not always occur, and when it does, it coincides with the second **lactate** and ventilatory gas exchange **thresholds**. It can thus be used for the **determination** of optimal intensity for individualized aerobic training.

Record Date Created: 19930106

Record Date Completed: 19930106

23/7/21 (Item 21 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)

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0008812156 BIOSIS NO.: 199395114422

Respiratory gas exchange indices used to detect the blood lactate accumulation threshold during an incremental exercise test in young athletes

AUTHOR: Ahmaidi S (Reprint); Hardy J M; Varray A; Collomp K; Mercier J; Prefaut C

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JOURNAL: European Journal of Applied Physiology and Occupational Physiology 66 (1): p31-36 1993

ISSN: 0301-5548

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: English

ABSTRACT: The **time** course of changes in blood **lactate concentration** and ventilatory gas exchange was studied during an incremental **exercise** test on a cycle ergometer to **determine** if the **lactate accumulation threshold** (LT-2) could be accurately estimated by the use of respiratory indices (VT-2) in young athletes. LT-2 was defined as the starting point of **accelerated lactate accumulation**. VT-2 was identified by the second exponential increase in \dot{V}_{O_2} and the ventilatory equivalent for O₂ uptake with a concomitant nonlinear increase in the ventilatory equivalent for CO₂ output. Twelve trained subjects, aged 18-22 years, participated in this study. The initial power setting was 30 W for 3 min with successive increases of 30 W every minute except at the end of the test when the increase was reduced. Ventilatory flow (\dot{V}_E),

oxygen uptake ($\dot{V}O_2$), carbon dioxide output ($\dot{V}CO_2$), and ventilatory equivalents of $\dot{V}O_2$ and $\dot{V}CO_2$ were **determined** during the last 30 s of every minute. Venous blood samples were drawn at the end of each stage of **effort** and analysed enzymatically for **lactate concentration**. After each test, LT-2 and VT-2 were **determined** visually by two investigators from the graphic results using a double-blind procedure. The results (mean (SEM)) indicate no significant difference between LT-2 and VT-2 expressed as $\dot{V}O_2$ (43.98 (1.70) vs 44.93 (2.39) ml $\text{cntdot min}^{-1} \text{ cntdot kg}^{-1}$), lactataemia (4.01 (0.28) vs 4.44 (0.37) mM cntdot l^{-1}), or heart **rate** (171 (3.36) vs 173 (3.11) min^{-1}). In addition, strong correlations were noted between the two methods for $\dot{V}O_2$ ($r = 0.90$, $P < 0.001$), lactataemia ($r = 0.75$, $P < 0.01$), and heart **rate** ($r = 0.96$, $P < 0.001$). It is concluded that VT-2 coincides with LT-2 **determination** and that the ventilatory gas exchange method can thus satisfactorily evaluate the **lactate accumulation threshold** in young athletes.

23/7/22 (Item 22 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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10213335 PMID: 7957150

Plasma catecholamines during endurance exercise of different intensities as related to the individual anaerobic threshold .

Urhausen A; Weiler B; Coen B; Kindermann W

Institute of Sports and Performance Medicine, University of Saarland, Saarbrücken, Germany.

European journal of applied physiology and occupational physiology (GERMANY) 1994, 69 (1) p16-20, ISSN 0301-5548--Print Journal Code: 0410266

Publishing Model Print

Document type: Clinical Trial; Journal Article; Randomized Controlled Trial

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The study investigated the **concentrations** of free plasma catecholamines (CAT), adrenaline and noradrenaline, in comparison to heart **rate** and **lactic acid concentrations** during endurance **exercises** (EE) of different intensities related to the individual **anaerobic threshold** (IAT). A group of 14 endurance trained male athletes took part in the tests on a treadmill. After an exhausting incremental graded test (increasing 0.5 m.s⁻¹ every 3 min) to **determine** the IAT, the subjects performed EE of 45 min in randomized order with intensities of 85%, 95%, 100% and 105% (E85-E105) of the IAT. The heart **rate** and CAT increased continuously during all EE. The CAT reacted sensitively to EE above IAT (E105) and showed an overproportional increase in comparison to EE performed with an intensity at or below IAT. At the same **time**, at **exercise** intensities up to IAT (E85-E100) a **lactate** steady state was observed whereas mean **lactate concentrations** increased during E105. The changes of **lactate concentration** allowed a better differentiation between E85-E100 as CAT measurements. In E95, E100 and E105 there was a partial overlap of heart **rate**, which in contrast to **lactate concentration** only differed by about 5%, so that small variations in heart **rate** could have coincided with considerable differences of **exercise** intensity when working at intensities near or above IAT. It was concluded that the range of IAT

seemed to represent a real physiological breakpoint which corresponded to the aerobic-**anaerobic** transition.

Record Date Created: 19941208

Record Date Completed: 19941208

23/7/23 (Item 23 from file: 155)
DIALOG(R) File 155:MEDLINE(R)
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10196677 PMID: 7941654

Determination of the anaerobic threshold by gas exchange: biochemical considerations, methodology and physiological effects.

Wasserman K; Stringer W W; Casaburi R; Koike A; Cooper C B

Department of Medicine, Harbor-UCLA Medical Center, Torrance.

Zeitschrift fur Kardiologie (GERMANY) 1994, 83 Suppl 3 p1-12, ISSN 0300-5860--Print Journal Code: 0360430

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

This paper explains the physiological and biochemical basis of the **anaerobic threshold** (AT), achieved during physical **exercise**. The **lactate concentration** is approximately the same at rest in relatively fit adults, in normal sedentary subjects in adult patients with heart disease. But during **exercise**, the increase of **lactate** is inversely related to the physical fitness of the individual. During incremental work, the **lactate concentration** increases initially very little until a distinct metabolic **rate** (VO_2 AT) is reached at which **lactate** starts to increase steeply (**anaerobic threshold** /AT; VO_2 AT). Above the **anaerobic threshold**, accelerated glycolysis increases muscle **lactic acidosis**. This acidosis is buffered primarily by bicarbonate. The bicarbonate-derived CO_2 causes an increased alveolar CO_2 output relative to O_2 uptake. Oxygen uptake is increased virtually linearly with work **rate** in healthy subjects with a slope of approximately 10 ml O_2 /min/Watt. VCO_2 starts to increase more steeply in the mid-work- **rate** range after an initial linear behavior. This steepening is caused by an increased CO_2 production from the HCO_3^- -buffering of **lactic acid** for the range of work **rates** above the AT. Below the AT, the slope of increase in VCO_2 is 1 or slightly less, averaging 0.95. Above the AT, it is greater than 1. The submaximal **exercise** protocol for the **determination** of AT includes a period of 2-3 min of unloaded cycling, a ramp program with x Watt increase/minute and a recovery period of 2 min. X is the **rate** of work **rate** increase per min, so that the incremental period of the **exercise** test lasts 8-10 min, **stressing** the patient for only a short **time**. The **anaerobic threshold** can be **determined** during the ramp program using the following four parameters: 1) steeper increase of VCO_2 as compared to VO_2 (V-slope-method); 2) respiratory exchange ratio = 0.95; 3) PETO_2 increase; 4) VE/VO_2 increase. The V-slope-method can be successfully applied, not only in healthy volunteers, but also in patients suffering from cardiac and/or pulmonary (breathing abnormalities) diseases. The so far published data show that the **anaerobic threshold** in healthy people and patients is a highly reproducible, accurately measurable, securely achievable parameter for the non-invasive evaluation of the individual cardiopulmonary **exercise** capacity.

Record Date Created: 19941121

Record Date Completed: 19941121

23/7/25 (Item 25 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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10112793 PMID: 8039519

Plasma lactate concentration increases as a parabola with delay during ramp exercise.

Peronnet F; Morton R H

Departement d'education physique, Universite de Montreal, Canada.

European journal of applied physiology and occupational physiology (GERMANY) 1994, 68 (3) p228-33, ISSN 0301-5548--Print

Journal Code: 0410266

Publishing Model Print; Erratum in Eur J Appl Physiol 1994;69(4) 370

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

This study presents an elementary model of a system which relates plasma lactate concentration ([La-]) during ramp exercise to its rate of accumulation (Rc) within its extramuscular distribution space (S). Under the parsimonious assumptions that Rc increases linearly with time (t) with a kinetic delay (delta), and that the volume of S is constant, it is shown that plasma [La-] increases as a parabola with the kinetic delay delta when t increases. This elementary system model describes changes in plasma [La-] observed in five healthy young subjects during ramp exercise on the cycle ergometer (1 W every 2 s) with great accuracy (r > 0.99) with very small residuals (average value less than 0.01 mmol.l-1), randomly distributed around the fitting curves. The delay between the beginning of exercise and the onset of increase in Rc could be due to the fact that at the corresponding work rates: (1) rate of lactate appearance (Ra), which is equal to the rate of lactate disappearance (Rd), is not modified from rest, since the exercising muscles work in fully aerobic conditions (hypothesis of the anaerobic threshold); or (2) the increase in Ra is associated with a similar increase in Rd. An alternate or complementary hypothesis is that, during ramp exercise, plasma [La-] could reflect metabolic events within the muscles, with a significant delay.

Record Date Created: 19940823

Record Date Completed: 19940823

23/7/26 (Item 26 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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10057205 PMID: 8194549

The use of critical power as a determinant for establishing the onset of blood lactate accumulation.

Clingeleffer A; McNaughton L R; Davoren B

Centre for Human Movement, University of Tasmania at Launceston, Australia.

European journal of applied physiology and occupational physiology (GERMANY) 1994, 68 (2) p182-7, ISSN 0301-5548--Print Journal Code:

0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Eight highly trained male kayakers were studied to **determine** the relationship between critical power (CP) and the **onset** of **blood lactate accumulation** (OBLA). Four **exercise** sessions of 90 s, 240 s, 600 s, and 1200 s were used to identify the CP of each kayaker. Each individual CP was obtained from the line of best fit (LBFCP) obtained from the progressive work output/ **time** relationships. The OBLA was identified by the 4 mmol.l-1 **blood lactate concentration** and the work output at this level was **determined** using a **lactate** curve test. This consisted of paddling at 50 W for 5 min after which a 1-min rest was taken during which a 25-microliters blood sample was taken to analyse for **lactate**. **Exercise** was increased by 50 W every 5 min until exhaustion, with the blood sample being taken in the 1-min rest period. The **exercise** intensity at the OBLA for each subject was then **calculated** and this was compared to the **exercise** intensity at the LBFCP. The intensity at LBFCP was found to be significantly higher ($t = 2.115$, $P < 0.05$) than that at the OBLA of 4 mmol.l-1. These results were further confirmed by significant differences being obtained in **blood lactate concentration** ($t = 8.063$, $P < 0.05$) and heart **rate** values ($t = 2.90$, $P < 0.05$) obtained from the **exercise** intensity at LBFCP over a 20-min period and that of the **anaerobic threshold** (Th(an)) parameters obtained from the **lactate/heart rate** curve. (ABSTRACT TRUNCATED AT 250 WORDS)

Record Date Created: 19940624

Record Date Completed: 19940624

23/7/27 (Item 27 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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09818483 PMID: 8244602

Adaptations to six months of aerobic swim training. Changes in velocity, stroke rate, stroke length and blood lactate.

Wakayoshi K; Yoshida T; Ikuta Y; Mutoh Y; Miyashita M

Laboratory of Motor Behavioral Education, Faculty of Health and Sport Sciences, Osaka University, Japan.

International journal of sports medicine (GERMANY) Oct 1993, 14 (7) p368-72, ISSN 0172-4622--Print Journal Code: 8008349

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The purpose of this investigation was to **determine** how swimming velocity (SV), **stroke rate** (SR), **stroke length** (SL) and **blood lactate concentration** change as adaptations to six months of aerobic swim training. Subjects were trained male college swimmers ($n = 8$). **Measurements** were obtained following specially designed 400m freestyle swim tests, pre- and post-intervention. The swim test consisted of 4 x 400 m freestyle over two days. On day 1, subjects performed a maximal **effort** 400 m freestyle swimming trial; maximal mean velocity (V_{max}) for each swimmer was **calculated** from this **effort**. On the next day, subjects were instructed to perform three 400 m freestyle swims at constant velocities equal to 85%, 90% and 95% of V_{max} , respectively. Subjects rested one hour between swims. During each 400 m trial, **lap time** and **time** to complete 10 mid-pool strokes (50 m) were **measured** to **determine** SV (m.s-1), SR (stroke.min-1) and SL (m.stroke-1). Mixed arterial blood samples were taken at the end of each 400 m trial to

evaluate blood lactate concentration . Results indicated that post-maximal swimming velocity (Vpostmax) increased significantly from pre-intervention measures (p < 0.05). Blood lactate concentration decreased significantly relative to SV and absolute lactate concentration following Vpostmax was significantly lower than that at Vpremax (p < 0.05). Six of seven subjects increased Vmax due to increases in SL. Mean SL during the second test was significantly higher (p < 0.05). Also, during the 400 m maximal test, SL increased significantly after sixth lap (p < 0.05). There was no significant difference between SRs. (ABSTRACT TRUNCATED AT 250 WORDS)

Record Date Created: 19940106

Record Date Completed: 19940106

23/7/28 (Item 28 from file: 155)

DIALOG(R)File 155:MEDLINE(R)

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09794050 PMID: 8223521

Aerobic and anaerobic indices contributing to track endurance cycling performance.

Craig N P; Norton K I; Bourdon P C; Woolford S M; Stanef T; Squires B; Olds T S; Conyers R A; Walsh C B

South Australian Sports Institute, Adelaide.

European journal of applied physiology and occupational physiology (GERMANY) 1993, 67 (2) p150-8, ISSN 0301-5548--Print Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

A group of 18 male high performance track endurance and sprint cyclists were assessed to provide a descriptive training season specific physiological profile, to examine the relationship between selected physiological and anthropometric variables and cycling performance in a 4000-m individual pursuit (IP4000) and to propose a functional model for predicting success in the IP4000. Anthropometric characteristics, absolute and relative measurements of maximal oxygen uptake (VO2max), blood lactate transition thresholds (Thla- and Th(an),i), VO2 kinetics, cycling economy and maximal accumulated oxygen deficit (MAOD) were assessed, with cyclists also performing a IP4000 under competition conditions. Peak post-competition blood lactate concentrations and acid-base values were measured. Although all corresponding indices of Thla- and Th(an),i occurred at significantly different intensities there were high intercorrelations between them (0.51-0.85). There was no significant difference in MAOD when assessed using a 2 or 5 min protocol (61.4 vs 60.2 ml.kg-1, respectively). The highest significant correlations were found among IP4000 and the following: VO2max (ml.kg-2/3.min-1; r = -0.79), power output at lactate threshold (Wthla) (W; r = -0.86), half time of VO2 response whilst cycling at 115% VO2max (s; r = 0.48) and MAOD when assessed using the 5 min protocol (ml.kg-1; r = -0.50). A stepwise multiple regression yielded the following equation, which had an r of 0.86 and a standard error of estimate of 5.7 s: IP4000 (s) = 462.9 - 0.366 x (Wthla) - 0.306 x (MAOD) - 0.438 x (VO2max) where Wthla is in W, MAOD is in ml.kg-1 and VO2max is in ml.kg-1 x min-1. (ABSTRACT TRUNCATED AT 250 WORDS)

Record Date Created: 19931210

Record Date Completed: 19931210

23/7/30 (Item 30 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)

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0009887141 BIOSIS NO.: 199598354974

Effects of experimental acid-base disturbance on blood lactate kinetics during incremental exercise

AUTHOR: Suzuki Masato; Kawabe Noriko; Machida Katsuhiko

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JOURNAL: Japanese Journal of Physical Fitness and Sports Medicine 44 (2):

p297-305 1995 1995

ISSN: 0039-906X

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: Japanese

ABSTRACT: The present study was conducted to investigate the effect of acid-base disturbance on blood lactate concentration (bLA) and OBLA (Onset of Blood Lactate Accumulation) during an incremental bicycle test. Nine healthy male subjects underwent the incremental test at 60 min after the oral administration of NH₄Cl (acidotic-treatment; Acid), NaHCO₃ (alkalotic-treatment; Alk) and NaCl (control; Cont) at 1.87 mM cnddot kg⁻¹ body weight. Exercise was started at a load of 80 W, which was subsequently increased by 10 W every minute until exhaustion. During exercise, O₂ intake (ovrhdot VO₂), ventilatory volume (ovrhdot VE) and heart rate (HR) were monitored continuously. Venous blood samples were obtained before administration and every 2 min during exercise. No change could be detected in resting ovrhdot VO₂, ovrhdot VE and HR following oral administration of NH₄Cl, NaHCO₃ and/or NaCl. At 60 min after oral administration venous blood pH (vpH) and bicarbonate ion concentration (v(HCO₃⁻)) were significantly lower in Acid (7.265 ± 0.033; p lt 0.001, 23.6 ± 1.8 mM cnddot l⁻¹; p lt 0.01); and significantly higher in Alk (7.370 ± 0.045; p lt 0.01, 29.7 ± 1.6 mM cnddot l⁻¹ p lt 0.01) compared to Cont (7.318 ± 0.041, 26.6 ± 2.1 mM cnddot l⁻¹). Changes in ovrhdot VO₂, ovrhdot VE and HR during exercise were essentially the same in all cases. No differences were observed in exercise time. During exercise, vpH and v(HCO₃⁻) gradually decreased, but remained significantly lower in Acid and higher in Alk compared to Cont. Blood lactate concentration (bLA) increased during exercise. Peak values were observed at exhaustion, but it was lower in Acid (8.03 ± 1.18 mM cnddot l⁻¹) and higher in Alk (10.73 ± 1.48) compared to Cont (9.49 ± 1.79) in all subjects. The Onset of Blood Lactate Accumulation (OBLA) was determined for each subject. OBLA was significantly higher in Acid (71.9 ± 9.1% ovrhdot VO₂max) than Cont (62.5 ± 9.9% ovrhdot VO₂max) and Alk (62.2 ± 8.0% ovrhdot VO₂max). Changes in acid-base balance were found to cause differences in bLA responses to the same exercise load and possibly change OBLA. Care must be taken when using OBLA or LT as an index of aerobic capacity in some patients with acid-base disorders; hemodialytic, obese or diabetic patient.

23/7/31 (Item 31 from file: 45)

DIALOG(R)File 45:EMCare

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00256361 EMCare No: 126488403

Comparison of the lactate and ventilatory thresholds during prolonged work

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University of British Columbia, 6081 University Blvd., Vancouver, BC V6T
1Z1 Canada

Biology of Sport (BIOL. SPORT) (Poland) 1996, 13/1 (3-12)

ISSN: 0860-021X

DOCUMENT TYPE: Journal ; Review

LANGUAGE: ENGLISH SUMMARY LANGUAGE: ENGLISH

NUMBER OF REFERENCES: 35

RECORD TYPE: Abstract

The purpose of this investigation was to compare the ventilatory threshold (TSUBvent) with the lactate threshold (TSUBlact) during 60 min of steady-state exercise at the calculated thresholds. Eight trained, male cyclists (mean age 23.3+/-3.0 years, body mass 70.0+/-7.1 kg, VOSUB2max 61.02+/-4.15 ml.kgSUP-1.minSUP-1) performed a progressive intensity cycling test (23 W/min) for determining TSUBlact and TSUBvent. TSUBvent was determined by the non-linear increase in excess COSUB2 (ExCOSUB2) while TSUBlact was calculated by the "individual anaerobic threshold" (IAT) method. Subsequently, subjects performed an up to 60 min steady-state exercise at the threshold workloads the results at TSUBlact being significantly higher from those at TSUBvent at P<0.01 in VOSUB2, ExCOSUB2, HR, blood lactate concentration (BLa) and workload, as calculated by Hotelling's TSUP2-test. During the steady state exercise at each specified workload, VOSUB2, BLa, heart rate and ExCOSUB2 were measured at 15 min intervals. All subjects completed the steady-state exercise at TSUBvent (VSS) while the steady-state exercise at TSUBlact (LSS) - only 2 subjects (mean time 48.4 min). Comparison of metabolic variables using MANOVA and multiple comparisons revealed significant differences between VSS and LSS for HR and VOSUB2 at all time intervals, for BLa at 30 and 45 min intervals and for ExCOSUB2 at the 30 min interval. Furthermore, examination of BLa over time using trend analysis revealed a stabilization during VSS (3.05 mmol.lSUP-1) whereas BLa continuously increased over time during LSS. Our findings indicate that TSUBlact (IAT method) overestimates the ability to perform prolonged work over 45 min while TSUBvent (ExCOSUB2) allows for steady-state exercise longer than 60 min.

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23/7/34 (Item 34 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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11283374 PMID: 9118720

Dangerous curves. A perspective on exercise, lactate, and the anaerobic threshold

Myers J; Ashley E

Cardiology Division, Palo Alto Department of Veterans Affairs Medical Center, Stanford University, Calif, USA.

Chest (UNITED STATES) Mar 1997, 111 (3) p787-95, ISSN 0012-3692--
Print Journal Code: 0231335

Publishing Model Print

Document type: Journal Article; Review

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

A number of general observations can be made from these recent studies. **Lactate** is a ubiquitous substance that is produced and removed from the body at all times, even at rest, both with and without the availability of oxygen. It is now recognized that **lactate accumulates** in the blood for several reasons, not just the fact that oxygen supply to the muscle is inadequate. **Lactate** production and removal is a continuous process; it is a change in the **rate** of one or the other that **determines** the blood **lactate** level. Rather than a specific **threshold**, there is most likely a period of **time** during which **lactate** production begins to exceed the body's capacity to remove it (through buffering or oxidation in other fibers). It may be appropriate to replace the term " **anaerobic threshold** " to a more functional description, since the muscles are never entirely **anaerobic** nor is there always a distinct **threshold** ("oxygen independent glycolysis" among others has been suggested) **Lactate** plays a major role as a metabolic substrate during **exercise**, is the preferred fuel for slow-twitch muscle fibers, and is a precursor for liver gluconeogenesis. The point at which **lactate** begins to **accumulate** in the blood, causing an increase in ventilation, is important to document clinically. Irrespective of the underlying mechanism or specific **model** that describes the process, the physiologic changes associated with **lactate accumulation** have significant import for cardiopulmonary performance. These include metabolic acidosis, impaired muscle contraction, hyperventilation, and altered oxygen **kinetics** , all of which contribute to an impaired capacity to perform work. Thus, any delay in the **accumulation** of blood **lactate** which can be attributed to an intervention (drug, **exercise** training, surgical, etc) may add important information concerning the efficacy of the intervention. A **substantial body of evidence is available demonstrating that lactate accumulation occurs later** (shifting to a higher percentage of Vo2max) after a period of endurance training. In athletes, the level of work that can be sustained prior to **lactate accumulation** , visually **determined** , is an accurate predictor of endurance performance. Presumably, these concepts have implications related to vocation/disability among patients with cardiovascular and pulmonary disease, but few such applied studies have been performed outside the laboratory. Blood **lactate** during **exercise** and its associated ventilatory changes maintain useful and interesting applications in both the clinical **exercise** laboratory and the sport sciences. However, the mechanism, interpretation, and application of these changes continue to rely more on tradition and convenience than science. (105 Refs.)

Record Date Created: 19970424

Record Date Completed: 19970424

23/7/1 (Item 1 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

(c) format only 2006 Dialog. All rts. reserv.

04444085 PMID: 871279 Record Identifier: 77181242

Correlates of maximal oxygen consumption during treadmill exercise.

Sellers D R; Kennealy J A; Kirkland J S; Vittorio N; Oloff C M

Aviation, space, and environmental medicine (UNITED STATES) Feb 1977,

48 (2) p111-4, ISSN 0095-6562--Print Journal Code: 7501714

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Other Citation Owner: NASA

Record type: MEDLINE; Completed

According to the Balke treadmill protocol, 39 healthy male USAF volunteers were subjected to maximal **exercise**. The subjects as a group passed the **anaerobic threshold** by the end of **exercise** since average venous **lactate concentrations** increased from 11.2 +/- 1.6 mg% (95% confidence limits) to 93.0 +/- 8.5 mg% (95% confidence limits), and the average gas exchange ratio (R) at the end of the **exercise** was greater than unity (p less than 0.0005). Tests for correlations showed weak but statistically significant (p less than 0.05) relationships between change in venous **lactic acid concentrations** and R (r = 0.44) and maximal heart rate (r = 0.34). Maximal oxygen consumption was correlated with **time of exercise** (r = 0.70) and subject weight (r = 0.33). Subject age and initial plasma **lactate concentrations** were not significantly correlated with any other variables. Multiple linear regression yielded an **equation** for prediction of maximal oxygen consumption which included terms for **time of exercise** and subject weight. Although the multiple correlation coefficient (r = 0.75) was statistically significant (p less than 0.05), it was considered insufficient for accurate prediction of maximal oxygen consumption.

Record Date Created: 19770630

Record Date Completed: 19770630

23/7/5 (Item 5 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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06818902 PMID: 3902770

Effects of detraining on responses to submaximal exercise.

Coyle E F; Martin W H; Bloomfield S A; Lowry O H; Holloszy J O

Journal of applied physiology (Bethesda, Md. - 1985) (UNITED STATES)

Sep 1985, 59 (3) p853-9, ISSN 8750-7587--Print Journal Code: 8502536

Contract/Grant No.: AG-00078; AG; NIA; NS-08862; NS; NINDS

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Seven endurance-trained subjects were studied 12, 21, 56, and 84 days after cessation of training. Heart rate, ventilation, respiratory exchange ratio, and blood **lactate concentration** during submaximal **exercise** of the same absolute intensity increased (P less than 0.05) progressively during the first 56 days of detraining, after which a stabilization occurred. These changes paralleled a 40% decline (P less than 0.001) in mitochondrial enzyme activity levels and a 21% increase in total **lactate dehydrogenase (LDH) activity** (P less than 0.05) in trained skeletal muscle. After 84 days of detraining, the experimental subjects' muscle mitochondrial enzyme levels were still 50% above, and LDH activity was 22% below, sedentary control levels. The blood **lactate threshold** of the detrained subjects occurred at higher absolute and relative (i.e., 75 +/- 2% vs. 62 +/- 3% of maximal O2 uptake) **exercise intensities** in the subjects after 84 days of detraining than in untrained controls (P less than 0.05). Thus it appears that a portion of the adaptation to prolonged and intense endurance training that is responsible for the higher **lactate threshold** in the trained state persists for a long time (greater than 85 days) after training is stopped.

Record Date Created: 19851210
Record Date Completed: 19851210

23/7/6 (Item 6 from file: 155)
DIALOG(R) File 155:MEDLINE(R)
(c) format only 2006 Dialog. All rts. reserv.
06685456 PMID: 2859796 Record Identifier: 85195989
**Metabolic adaptations to exercise: a review of potential
beta-adrenoceptor antagonist effects.**

Karlsson J
American journal of cardiology (UNITED STATES) Apr 26 1985, 55 (10)
p48D-58D, ISSN 0002-9149--Print Journal Code: 0207277
Publishing Model Print
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Other Citation Owner: NASA
Record type: MEDLINE; Completed

Human skeletal muscle contains 2 muscle fiber types: slow twitch (type I) and fast twitch (type II). They have different profiles including their biochemical, metabolic, O₂ diffusion, microcirculatory and neuromotor characteristics. The slow twitch fiber represents endurance, high combustive potential and recruitment during moderate activity; in contrast, the fast twitch represents explosiveness, force, high capacity for phosphate splitting and lactate formation, but is more fatiguable. A muscle rich in slow twitch fibers is confined to low peripheral resistance at rest and during exercise, higher exercise leg blood flow and higher maximal oxygen uptake (VO₂ max). During graded exercise lactate has been shown to be a good marker for the metabolic and circulatory characteristics of the contracting muscle and the exercise intensity (W) eliciting a blood lactate concentration of 4 mmol/liter-1 [(WOBLA) from onset of blood lactate accumulation] integrated for peripheral metabolic, neuromotor and central circulatory potentials both in health and disease. It is well known that a blood lactate level greater than 4 mmol/liter-1 represents a major increase in sympathetic tone and is incompatible with endurance or prolonged exercise. With prolonged exercise and sympathetic regulation both circulation and metabolism adapt. Adipose tissue is stimulated and fatty acids are released. Muscle tissue lipoprotein lipase activity is enhanced; that is, there is increased utilization of blood triglycerides for local lipolysis in the capillary bed of the contracting muscle. Both mechanisms will increase fatty acid availability and induce a "glycogen-sparing effect" resulting in a reduced respiratory exchange ratio. Studies have shown that both the magnitude of the initial glycogen stores and these adaptive responses will determine performance time. With age, changes take place in heart rate regulation, neuromotor control and muscle fibers. Thus VO₂ max is decreased, but partly compensated for by a fast motor unit and fiber loss leading to a muscle more rich in slow twitch fibers--an "endurance training-like effect." Relative endurance is also increased with age; however, lactate metabolism is still a critical feature. The OBLA concept describes capacity for both occupational and leisure-time physical activity.

Record Date Created: 19850606
Record Date Completed: 19850606

23/7/18 (Item 18 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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09146562 PMID: 1735417

Day-to-day changes in oxygen uptake kinetics at the onset of exercise during strenuous endurance training.

Yoshida T; Udo M; Ohmori T; Matsumoto Y; Uramoto T; Yamamoto K

Exercise Physiology Laboratory, Faculty of Health and Sport Sciences, Osaka University, Japan.

European journal of applied physiology and occupational physiology (GERMANY) 1992, 64 (1) p78-83, ISSN 0301-5548--Print Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The aim of this study was to assess the effect of strenuous endurance training on day-to-day changes in oxygen uptake (VO₂) on-kinetics (time constant) at the onset of exercise. Four healthy men participated in strenuous training for 30 min.day⁻¹, 6 days.week⁻¹ for 3 weeks. The VO₂ was measured breath-by-breath every day except Sunday at exercise intensities corresponding to the lactate threshold (LT) and the onset of blood lactate accumulation (OBLA) which were obtained before training. Furthermore, an incremental exercise test was performed to determine LT, OBLA and maximal oxygen uptake (VO₂max) before and after the training period and every weekend. The 30-min heavy endurance training was performed on a cycle ergometer 5 days.week⁻¹ for 3 weeks. Another six men served as the control group. After training, significant reductions of the VO₂ time constant for exercise at the pretraining LT exercise intensity (P less than 0.05) and at OBLA exercise intensity (P less than 0.01) were observed, whereas the VO₂ time constants in the control group did not change significantly. A high correlation between the decrease in the VO₂ time constant and training day was observed in exercise at the pretraining LT exercise intensity (r = -0.76; P less than 0.001) as well as in the OBLA exercise intensity (r = -0.91; P less than 0.001). A significant reduction in the blood lactate concentration during submaximal exercise and in the heart rate on-kinetics was observed in the training group. (ABSTRACT TRUNCATED AT 250 WORDS)

Record Date Created: 19920306

Record Date Completed: 19920306

23/7/19 (Item 19 from file: 5)

DIALOG(R) File 5:Biosis Previews(R)

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0008727115 BIOSIS NO.: 199395029381

Physiological study on the field endurance test of Leger and Gadoury

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JOURNAL: Science and Sports 7 (2): p93-99 1992

ISSN: 0765-1597

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: French

ABSTRACT: In order to assess aerobic power and endurance, a field test, consisting of a progressive and maximal run was proposed by Canadian authors (Leger and Gadoury, 1989). This indirect method is original and interesting as the **effort** is progressive and contrasts with the continuous speed of other field tests. Physiological responses were checked by **measuring** heart **rates** and blood **lactate** during the multistage test. Athletic and non athletic subjects (N = 156), comprising 119 young men and 37 young women, displayed very high heart **rate** values during maximal **exercise**; on average the values reached 194.5 +/- 6.5 to 201.3 +/- 7.1 bpm to the various group. Simultaneously, the average **lactate** blood **concentration** was 11.7 +/- 2.4 mmol/l among young men and 11.1 +/- 1.8 among young women. Thus, the participation of the **anaerobic** metabolism is quite significant. Moreover, it starts early during the test. For instance, among nine physical education students, the **anaerobic threshold** **measured** by **lactate** blood **accumulation** beyond 4 mmol/l appeared on average 5.7 levels lower than the individual maximum. At that **time**, the average heart **rate** was 173 bpm. Nevertheless, the **anaerobic threshold** cannot be **determined** precisely and accurately by only **measuring** the heart **rate**. Indeed, high individual variations - between 159 to 181 bpm - have been observed. Moreover, a change in the cardiac performance with levelling of the pulse **rate** was nearly observed. Establishing the **anaerobic threshold** remains difficult since it requires several tests with numerous stops to make blood samples.

23/7/24 (Item 24 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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10151759 PMID: 8076624

Relative functional buffering capacity in 400-meter runners, long-distance runners and untrained individuals.

Rocker K; Striegel H; Freund T; Dickhuth H H
Eberhard-Karls-Universitat Tubingen, Medizinische Klinik und Poliklinik, Abt. Sportmedizin, Tubingen, Germany.

European journal of applied physiology and occupational physiology (GERMANY) 1994, 68 (5) p430-4, ISSN 0301-5548--Print Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Buffering is a factor which influences performance in short and middle-term endurance by compensating **exercise** acidosis. The aim of the study was to establish whether respiration parameters are a relative **measure** of buffering capacity and to study the influence of buffering on specific performance parameters. Three groups (each of ten subjects) with defined degrees of adaptation [untrained (UT), aerobic-trained (AeT) and elite 400-m runners (AnT) with a best **time** of 48.47 +/- 0.98 s] were examined in an incremental multi-stage test on the treadmill. Breath-by-breath gas analysis was performed using mass spectrometry and computer routines. Serum **lactate concentrations** were **determined** at each **exercise** level until subjective exhaustion. A value for the relative functional buffering capacity (relFB) was **calculated** using **exercise** metabolic parameters. Running speed at the **lactate threshold** was used as the starting point of buffering. The start of respiratory compensation

of acidosis (RCP) was taken as the endpoint of buffering. RCP was determined at the point of decrease in end-tidal CO₂ content (CO₂-ET). RelFB was given in percent of buffering to running speed at RCP. Group AnT attained the same maximum performance data (maximum running speed, maximum rate of O₂ consumption) as group AeT. However, these values were attained in group AnT with a significantly higher relFB (AnT: 31.0 +/- 3.2% vs. AeT: 15.7 +/- 3.9%, P < 0.0001), while a higher lactate threshold indicated a greater oxidative capacity in AeT (AeT: 3.07 +/- 0.26 m.s⁻¹ vs. AnT: 2.68 +/- 0.22 m.s⁻¹). (ABSTRACT TRUNCATED AT 250 WORDS)

Record Date Created: 19941006

Record Date Completed: 19941006

23/7/29 (Item 29 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

(c) format only 2006 Dialog. All rts. reserv.

10766847 PMID: 8776208

Influence of test duration and event specificity on maximal accumulated oxygen deficit of high performance track cyclists.

Craig N P; Norton K I; Conyers R A; Woolford S M; Bourdon P C; Stanef T; Walsh C B

South Australian Sports Institute, Kidman Park, South Australia.

International journal of sports medicine (GERMANY) Nov 1995, 16 (8)
p534-40, ISSN 0172-4622--Print Journal Code: 8008349

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

This study examined the relationship between the time required to fully utilise the maximal accumulated oxygen deficit (MAOD) and event specificity of track cyclists. Twelve track endurance and 6 sprint high performance track cyclists performed four treatments of 70 s, 120 s, 300 s and 115% VO₂max of maximal cycling on an air-braked ergometer. Peak blood lactate was measured immediately after each test with VO₂ kinetics being assessed during the 115% VO₂max time to exhaustion test. When the two cycling groups were combined there was no significant difference in the MAOD when assessed under the four different exercise durations. However, when the groups were analysed separately the following results were apparent: (1) the sprint cyclists achieved a significantly greater MAOD (66.9 +/- 2.2 ml.kg⁻¹) compared to the track endurance cyclists (57.6 +/- 6.7 ml.kg⁻¹) when a 70 s test duration was employed (2) even though the track endurance cyclists achieved their greatest MAOD during the 300 s test protocol (62.1 +/- 11.0 ml.kg⁻¹), it was not significantly different to the MAOD's measured during the three other test durations and (3) the sprint cyclists recorded their greatest MAOD during the 70 s supramaximal test protocol (66.9 +/- 2.2 ml.kg⁻¹). This was not significantly different to the 120 s test MAOD, but it was significantly higher than the MAOD values recorded during the 115% VO₂max and 300 s test durations. There was no significant difference between the two groups in the peak post-exercise blood lactate concentrations for any of the tests and only the 70 s test produced a significant correlation between peak blood lactate and the MAOD. The VO₂ kinetics (VO₂ t_{1/2}) of the sprinters was significantly slower than that of the track endurance cyclists (26.3 +/- 2.3 vs 23.9 +/- 2.8 s.). The findings of this study demonstrate that sprint cyclists can fully express their anaerobic capacity within an event specific 70 s all-out test and

that these cyclists progressively decrease their **anaerobic** capacity during a 120 s, 115% VO₂max (mean **time** = 210 s) or 300 s test, despite giving all-out **efforts**. Conversely, track endurance cyclists achieve their highest mean score during an event specific 300 s test and their lowest during a 70 s test. These findings have important implications when testing high performance cyclists for **determination** of MAOD, with the implication that it is necessary to assess MAOD under **exercise** conditions (i.e., duration, pacing) specific to the cyclist's chosen event.

Record Date Created: 19961203

Record Date Completed: 19961203

23/7/33 (Item 33 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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11381840 PMID: 9202948

The effect of a thiamin derivative on exercise performance.

Webster M J; Scheett T P; Doyle M R; Branz M

Department of Physical Education, Western Illinois University, Macomb 61455, USA.

European journal of applied physiology and occupational physiology (GERMANY) 1997, 75 (6) p520-4, ISSN 0301-5548--Print Journal Code: 0410266

Publishing Model: Print

Document type: Clinical Trial; Journal Article; Randomized Controlled Trial

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The purpose of this study was to investigate the effect of a thiamin derivative, thiamin tetrahydrofurfuryl disulfide (TTFD), on oxygen uptake (VO₂), **lactate accumulation** and cycling performance during **exercise** to exhaustion. Using a randomized, double-blind, cross-over design with a 10-day washout between trials, 14 subjects ingested either 1 g.day⁻¹ of TTFD or a placebo (PL) for 4 days. On day 3, subjects performed a progressive **exercise**-test to exhaustion on a cycle ergometer for the **determination** of VO₂submax, VO₂peak, **lactate concentration** ([La-]), **lactate threshold** (ThLa) and heart **rate** (fc). On day 4, subjects performed a maximal 2000-m **time** trial on a cycle ergometer. A one-way analysis of variance (ANOVA) with repeated **measures** was used to **determine** significant differences between trials. There were no significant differences detected between trials for serial **measures** of VO₂submax, [La-] or fc. Likewise, VO₂peak [PL 4.06 (0.19) TTFD 4.12 (0.19) l.min⁻¹, P = 0.83], ThLa [PL 2.47 (0.17), TTFD 2.43 (0.16) l.min⁻¹, P = 0.86] and 2000-m performance **time** [PL 204.5 (5.5), TTFD 200.9 (4.3).s, P = 0.61] were not significantly different between trials. The results of this study suggest that thiamin derivative supplementation does not influence high-intensity **exercise** performance.

Record Date Created: 19970805

Record Date Completed: 19970805

23/7/35 (Item 35 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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11924265 PMID: 9754974

Effect of increasing running velocity on electroencephalogram in a field test

Mechau D; Mucke S; Weiss M; Liesen H

Institute of Sports Medicine, University of Paderborn, Germany.

European journal of applied physiology and occupational physiology (GERMANY) Sep 1998, 78 (4) p340-5, ISSN 0301-5548--Print

Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

This study was designed to **measure** the electroencephalogram (EEG) after **exercise** with increasing intensity. In a field test with increments in running velocity a 2-min EEG was recorded, together with blood **lactate concentration** and heart **rate**, after each stage. An individual protocol was used, with up to six stages of running to ensure comparability of **exercise** intensity among the subjects, in each of 19 athletes (17 men, 2 women) experienced in leisure- **time** running. The **exercise** consisted initially of three running stages of aerobic **exercise** intensity without blood **lactate accumulation** followed by stages with an increase of **lactate concentration**. The protocol of the field test led to a progressive increase in cortical activity directly after the stages without blood **lactate accumulation** mainly in the delta frequency band, followed by theta and alpha-1 frequency band, and less pronounced in the alpha-2 and in the beta frequency bands. After the stages with an **onset** and further increase of blood **lactate accumulation** significant decreases in the beta-2, beta-1 and alpha-1 frequency bands occurred predominantly in temporal (T3, T4, T5, and T6) and occipital (O1, and O2) electrode positions, indicating a stage-by-stage decrease of activity. This decrease may be explained by feed-back from working muscle, via afferents to the cortex from intero- and proprio-receptors and affective processes. This could suggest that through a higher running intensity indicated by an **onset** of blood **lactate accumulation** metabolic and mechanical changes led to alterations within the afferent systems influencing the level of cortical activity.

Record Date Created: 19981203

Record Date Completed: 19981203

23/7/39 (Item 39 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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12506918 PMID: 10453923

Effect of exercise modality on oxygen uptake kinetics during heavy exercise.

Jones A M; McConnell A M

Department of **Exercise** and Sport Science, Crewe and Alsager Faculty, The Manchester Metropolitan University, Alsager, UK.

European journal of applied physiology and occupational physiology (GERMANY) Aug 1999, 80 (3) p213-9, ISSN 0301-5548--Print

Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The mechanisms responsible for the oxygen uptake (VO₂) slow component during high-intensity **exercise** have yet to be established. In order to explore the possibility that the VO₂ slow component is related to the muscle contraction regimen used, we examined the pulmonary VO₂ **kinetics** during constant-load treadmill and cycle **exercise** at an **exercise** intensity that produced the same level of lactacidaemia for both **exercise** modes. Eight healthy subjects, aged 22-37 years, completed incremental **exercise** tests to exhaustion on both a cycle ergometer and a treadmill for the **determination** of the ventilatory **threshold** (defined as the **lactate threshold** , Th_{1a}) and maximum VO₂ (VO₂max). Subsequently, the subjects completed two "square-wave" transitions from rest to a running speed or power output that required a VO₂ that was halfway between the mode-specific Th_{1a} and VO₂max. Arterialised blood **lactate concentration** was **determined** immediately before and after each transition. The VO₂ responses to the two transitions for each **exercise** mode were **time** -aligned and averaged. The increase in blood **lactate concentration** produced by the transitions was not significantly different between cycling [mean (SD) 5.9 (1.5) mM] and running [5.5 (1.6) mM]. The increase in VO₂ between 3 and 6 min of **exercise**; (i.e. the slow component) was significantly greater in cycling than in running, both in absolute terms [290 (102) vs 200 (45) ml x min⁻¹; P<0.05] and as a proportion of the total VO₂ response above baseline [10 (3)% vs 6 (1)%; P < 0.05]. These data indicate that: (a) a VO₂ slow component does exist for high-intensity treadmill running, and (b) the magnitude of the slow component is less for running than for cycling at equivalent levels of lactacidaemia. The greater slow component observed in cycling compared to running may be related to differences in the muscle contraction regimen that is required for the two **exercise** modes.

Record Date Created: 19991026

Record Date Completed: 19991026

23/7/40 (Item 40 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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12108415 PMID: 10551337

The role of cadence on the VO₂ slow component in cycling and running in triathletes.

Billat V L; Mille-Hamard L; Petit B; Koralsztein J P

Faculte des Sciences de Sport, Universite Lille 2, Centre de Medecine du Sport CCAS, Paris, France. Veronique.Billat@Wanadoo.fr

International journal of sports medicine (GERMANY) Oct 1999, 20 (7)

p429-37, ISSN 0172-4622--Print Journal Code: 8008349

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The purpose of this study was to compare the effect of two different types of cyclic severe **exercise** (running and cycling) on the VO₂ slow component. Moreover we examined the influence of cadence of **exercise** (freely chosen [FF] vs. low frequency [LF]) on the hypothesis that: 1) a stride frequency lower than optimal and 2) a pedalling frequency lower than FF one could induce a larger and/or lower VO₂ slow component. Eight triathletes ran and cycled to exhaustion at a work-rate corresponding to the **lactate threshold** + 50% of the difference between the work-rate associated with VO₂max and the **lactate threshold** (delta 50) at a freely

chosen (FF) and low frequency (LF: - 10 % of FF). The **time** to exhaustion was not significantly different for both types of **exercises** and both cadences (13 min 39 s, 15 min 43 s, 13 min 32 s, 15 min 05 s for running at FF and LF and cycling at FF and LF, respectively). The amplitude of the VO2 slow component (i.e. difference between VO2 at the last and the 3rd min of the **exercise**) was significantly smaller during running compared with cycling, but there was no effect of cadence. Consequently, there was no relationship between the magnitude of the VO2 slow component and the **time** to fatigue for a severe **exercise** ($r = 0.20$, $p = 0.27$). However, **time** to fatigue was inversely correlated with the blood **lactate concentration** for both modes of **exercise** and both cadences ($r = - 0.42$, $p = 0.01$). In summary, these data demonstrate that: 1) in subjects well trained for both cycling and running, the amplitude of the VO2 slow component at fatigue was larger in cycling and that it was not significantly influenced by cadence; 2) the VO2 slow component was not correlated with the **time** to fatigue. If the nature of the linkage between the VO2 slow component and the fatigue process remains unclear, the type of contraction regimen depending on **exercise** biomechanic characteristics seems to be **determinant** in the VO2 slow component phenomenon for a same level of training.

Record Date Created: 19991126

Record Date Completed: 19991126

23/7/41 (Item 41 from file: 164)

DIALOG(R) File 164:Allied & Complementary Medicine

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Effect of hyperoxia on aerobic and anaerobic performances and muscle metabolism during maximal cycling exercise

Linossier MT; Dormois D; Arsac L; Denis C; Gay JP; Geyssant A; Lacour JR
Acta Physiol Scand 2000 Mar, VOLUME: 168, ISSUE: 3, PAGE: 403-12
168(

ABSTRACT: The hyperoxia-improved tolerance to maximal aerobic performance was studied in relation to **exercising** muscle metabolic state. Five students were submitted to four different tests on a cycle ergometer, each being conducted under normoxia and hyperoxia (60% FiO2) on separate days: Test 1, a progressive **exercise** until exhaustion to **determine** the maximal work load (Wmax) which was unchanged by hyperoxia; Test 2, an **exercise** at Wmax (287 +/- 12 W) until exhaustion to **determine** the performance **time** (texh) which was elevated by 38% under hyperoxia but exhaustion occurred at the same arterial proton and **lactate concentrations**; Test 3 (S- **Exercise** test) consisted of cycling at Wmax for 90% normoxic-texh (4.8 +/- 0.5 min under both O2 conditions) then followed by a 10-s sprint bout during which the total work output (Wtot) was **determined**; Wtot was elevated by 15% when **exercising** under hyperoxia; Test 4 (M-**Exercise** test) consisted also of cycling at Wmax for 4.8 +/- 0.5 min with blood and muscle samples taken at rest and at the end of the **exercise** to compare the level of different metabolites. During hyperoxic M-**Exercise** test, glycogen was twice more depleted whereas glucose-6-phosphate and **lactate** were less **accumulated** when compared with normoxia. No significant differences were observed for pyruvate, phosphocreatine and muscle/blood **lactate** ratio between the two conditions. Conversely to normoxia, levels of ATP, ADP and total NADH were maintained at their resting level under 60% FiO2. These data lead us to suppose a higher oxidation **rate** for pyruvate and NADH in mitochondria, thereby lowering the metabolic acidosis and allowing a better functioning of the glycolytic and contractile processes to delay the **time** to

exhaustion.

29/7/2 (Item 2 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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12307814 PMID: 10029336

Lactate determination in exercise testing using an electrochemical analyser: with or without blood lysis?

Thin A G; Hamzah Z; FitzGerald M X; McLoughlin P; Freaney R
Department of Physiology, University College Dublin, Ireland.

European journal of applied physiology and occupational physiology (GERMANY) Jan 1999, 79 (2) p155-9, ISSN 0301-5548--Print

Journal Code: 0410266

Publishing Model Print

Document type: Clinical Trial; Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The practical use of **lactate** electrochemical analysers in **exercise** testing has not been adequately examined. Initial studies have reported differences in **lactate** concentration between that **measured** spectrophotometrically and that **measured** electrochemically. The study described here was undertaken to compare, using the statistical technique of Bland and Altman (1986), two widely available methods of **measuring** **lactate** using lysed and non-lysed blood samples and the **lactate** **thresholds** derived from the **measured** **lactate** values using a log-log transform technique. Thirteen normal, healthy young adults (11 male) undertook progressive **exercise** tests to exhaustion. Arterialised venous blood samples were taken each minute and the **lactate** concentration therein was **measured** both spectrophotometrically and electrochemically and either with or without lysis of the blood samples. The **lactate** concentrations **measured** in lysed blood using both methods (182 pairs) were in close agreement. The electrochemical values obtained using non-lysed blood were systematically lower than spectrophotometric values (206 pairs), the difference becoming progressively greater at higher **lactate** concentrations. Results for the **lactate** **threshold** comparisons are given as mean difference (limits of agreement with 95% probability). **Lactate** **thresholds** (12 pairs) derived from lysed blood **lactate** concentrations **measured** spectrophotometrically and electrochemically were not significantly different -30 (240) ml O₂ x min⁻¹. **Lactate** **thresholds** (11 pairs) derived from lysed spectrophotometric and non-lysed electrochemical **measurements** were also not significantly different + 20 (250) ml O₂ x min⁻¹. Thus, despite the difference in the **measured** **lactate** concentrations, the derived **lactate** **thresholds** are in agreement and, therefore, electrochemical analysers can be used for **lactate** **threshold** **determination** using the log-log transform technique without sample lysis.

Record Date Created: 19990507

Record Date Completed: 19990507

29/7/4 (Item 1 from file: 73)

DIALOG(R) File 73:EMBASE

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05532377 EMBASE No: 1993300476

Anaerobic threshold in rats

Pilis W.; Zarzeczny R.; Langfort J.; Kaciuba-Uscilko H.; Nazar K.;
Wojtyna J.

Department of Physiology, Academy of Physical Education, 72 A Mikolowska
Str., 40-065 Katowice Poland

Comparative Biochemistry and Physiology - A Physiology (COMP. BIOCHEM.
PHYSIOL. A PHYSIOL.) (United Kingdom) 1993, 106/2 (285-289)

CODEN: CBPAB ISSN: 0300-9629

DOCUMENT TYPE: Journal; Article

LANGUAGE: ENGLISH SUMMARY LANGUAGE: ENGLISH

The aim of this study was to find out whether the **anaerobic threshold** (AT) can be estimated in rats running at increasing speed and if so what is the reproducibility of the **measurements**. **Lactate (LA) concentrations** in blood taken from 11 rats were **determined** during a discontinued, multistage treadmill **exercise** test repeated four **times** in each animal. It was found that blood LA changes vs speed have an exponential pattern with a distinct, rapid rise at the speed above 25 m/min which corresponds to blood LA of approx. 4 mmol/l. The variation coefficient of the speed at which AT occurred in individual animals ranged between 10 and 20%. These results offer a potential application of AT **determination** in the animal studies concerning mechanisms controlling **exercise** metabolism.

29/7/5 (Item 1 from file: 144)

DIALOG(R) File 144:Pascal

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07756348 PASCAL No.: 87-0235980

**Aussagewert und Anwendung im Trainingsprozess der bei Laufbandtests
ermittelten Laktatwerte von Laeufern**

(Valeur et utilisation dans la structuration de l'entrainement d'un test
de depistage du taux de lactate chez les coureurs)

(Value and utilisation in a training programm of a test that measure
lactate concentrations in runners)

WINTER R

Max-Kuhleemann-str. 23, Hannover 3000, Federal Republic of Germany

Journal: Schweizerische Zeitschrift fuer Sportmedizin, 1986, 34 (4)

155-159

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Country of Publication: Switzerland

Language: German Summary Language: FRENCH; ENGLISH

44/7/1 (Item 1 from file: 5)

DIALOG(R) File 5:Biosis Previews(R)

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0002918959 BIOSIS NO.: 198069032946

AEROBIC AND GLYCOLYTIC METABOLISM IN ARM EXERCISE

AUTHOR: PENDERGAST D (Reprint); CERRETELLI P; RENNIE D W

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**USA

JOURNAL: Journal of Applied Physiology Respiratory Environmental and
Exercise Physiology 47 (4): p754-760 1979

ISSN: 0161-7567

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: ENGLISH

ABSTRACT: Eight kayakers (K) and 3 sedentary subjects (S) performed arm cranking and pedaling while erect or supine at each of several work loads from submaximal to the highest they could sustain for 2 min and for intervals varying from 10 s to 5 min. From measurements of $\dot{V}O_2$ [rate of O₂ consumption] and blood lactate concentration, the aerobic and glycolytic energy release in arm work was assessed. For steady-state aerobic work all subjects had a mechanical efficiency averaging 0.24 independent of posture or exercise mode. Per unit fat-free limb volume, arm $\dot{V}O_2$ max [maximal O₂ consumption] of group K was 1.5-fold that of group S, whereas leg $\dot{V}O_2$ max was the same in each group. Compared to group S, glycolytic arm work in group K was characterized by: higher thresholds for release of lactate at the onset of submaximal work, lower blood lactate concentrations during comparable absolute or relative submaximal work, higher conventional anaerobic thresholds for absolute, but not relative work loads, higher maximal rates of lactate release and the same maximal blood lactate concentrations. Measurement of the early lactate threshold, which occurred at considerably lower arm loads than did anaerobic threshold, but which was greatly increased by specific muscle training, may provide a simple, sensitive, and nontraumatic evaluation of muscle training.

44/7/2 (Item 2 from file: 73)

DIALOG(R)File 73:EMBASE

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02219225 EMBASE No: 1982074386

Influence of fiber type composition and capillary density on onset of blood lactate accumulation

Tesch P.A.; Sharp D.S.; Daniels W.L.

Exercise Physiol. Div., US Army Res. Inst. Environm. Med., Natick, MA
United States

International Journal of Sports Medicine (INT. J. SPORTS MED.) (Germany
) 1981, 2/4 (252-255)

CODEN: IJSMDD

DOCUMENT TYPE: Journal

LANGUAGE: ENGLISH

Onset of blood lactate accumulation (OBLA) was determined in 16 healthy and physically active men (23-33 yrs) during cycling using a continuous stepwise increased exercise intensity protocol. OBLA was defined as the exercise intensity corresponding to a lactate concentration of 4 mmol.l^{sup} -sup 1 blood. Oxygen consumption, pulmonary ventilation, respiratory quotient (R), heart rate, and lactate concentration were monitored during each exercise intensity. Muscle biopsies were obtained from m. vastus lateralis at rest for determination of fiber type composition and capillary density. Calculated values (mean +/- SD) for exercise intensity, oxygen consumption and ventilation at OBLA were 159 (+/-37)W, 2.43 (+/-0.47) l.min^{sup} -sup 1, and 49.8 (+/-10.5) l.min^{sup} -sup 1 or 65(+/-10)% of V.(O_{inf} 2 max). OBLA (%V.(O_{inf} 2 max)) was found to correlate significantly (r = 0.75, P < 0.001) to the relative muscle area occupied by ST (type 1) fibers. Furthermore, 92% of the variance in OBLA could be explained by % ST area + capillary density. It is suggested that both inherent and adaptative qualities of the exercising muscle are of significance for the onset of blood lactate accumulation.

44/7/3 (Item 3 from file: 155)

DIALOG(R)File 155:MEDLINE(R)

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05597619 PMID: 7197214

The anaerobic threshold as determined before and during lactic acidosis.

Davis H A; Cass G C

European journal of applied physiology and occupational physiology (GERMANY, WEST) 1981, 47 (2) p141-9, ISSN 0301-5548--Print

Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

During this study the relationships between venous lactate concentration and associated changes in respiratory gas exchange were investigated. Five men performed two successive incremental exercise tests to exhaustion on an electronically braked cycle ergometer. These tests were separated by a 5 min rest period. During the initial test venous lactate concentrations showed a characteristic curvilinear increase and the anaerobic threshold (AT1) was determined conventionally. During the second test lactate concentrations were still decreasing at higher work rates than the AT1, and a second anaerobic threshold (AT2) was determined as the point where lactate concentrations again increased. The departure from linearity of the ventilatory response to both exercise tests occurred at a similar work rate, irrespective of whether venous lactate concentrations were increasing or decreasing. Carbon dioxide production was similar during the two exercise tests. The anaerobic thresholds as determined by respiratory gas analysis (ATR) were therefore similar for both tests. Results of this study indicate that changing venous lactate concentrations were not responsible for the ventilatory drive which occurred at the ATR. The venous lactate response to work at a constant rate determined within the range AT1-AT2 was also investigated. It was concluded that the lactate response to constant work rate will vary predictably at work rates falling within the AT1 to AT2 range. At AT1 no increase in venous lactate concentrations occurred, while at AT2 these increased progressively, and the test was terminated at varying times (12-15 min) due to subject exhaustion. At work rates determined from the ATR venous lactate concentrations varied according to the placement of the ATR within the AT1 AT2 range.

Record Date Created: 19811221

Record Date Completed: 19811221

44/7/4 (Item 4 from file: 23)

DIALOG(R)File 23:CSA Technology Research Database

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0002440467 IP ACCESSION NO: A84-10284

'Anaerobic threshold' - Problems of determination and validation

YEH, M P; GARDNER, R M; ADAMS, T D; YANOWITZ, F G; CRAPO, R O
Utah, University

Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology, v 55, p 1178-1186, Oct. 1983

PUBLICATION DATE: 1983

CONFERENCE:

, United States

DOCUMENT TYPE: Journal Article

RECORD TYPE: Abstract
LANGUAGE: English
ISSN: 0161-7567
NUMBERS: Contract: NIH-GM-23095
NO. OF REFS.: 33
FILE SEGMENT: Aerospace & High Technology
ABSTRACT:

The properties of various invasive and noninvasive **measures** used to **determine** an individual's **anaerobic threshold**, i.e., the oxygen consumption or work **rate** beyond which **lactate accumulates**, are investigated in an attempt to develop computerized **threshold** detection criteria. Arterial and venous blood samples were drawn and breath-by-breath gas responses were **measured** in eight normal subjects during rest, zero work load, and a work load increasing at the **rate** of 20 W/min. Arterial **lactate** appeared to rise smoothly throughout the work period in all subjects, while arterial bicarbonate showed gradual increases, followed by the expected decreases in half. Venous **lactate** levels were observed to lag arterial response by about 1.5 min. When four physiologists were asked to **determine** independently the **times of lactate accumulation** and the **anaerobic threshold** from the invasive and noninvasive data, respectively, interreviewer variability on the order of 16 percent was found. Invasive **measurements** thus **demonstrate** the lack of a **threshold** phenomenon, while noninvasive **measurements** show an unacceptably wide range of values for individual subjects.

44/7/5 (Item 5 from file: 155)
DIALOG(R) File 155:MEDLINE(R)
(c) format only 2006 Dialog. All rts. reserv.
06441406 PMID: 6748929

Exaggerated systolic blood pressure response to exercise in a water polo team.

Dlin R A; Dotan R; Inbar O; Rotstein A; Jacobs I; Karlsson J
Medicine and science in sports and exercise (UNITED STATES) Jun 1984,
16 (3) p294-8, ISSN 0195-9131--Print Journal Code: 8005433
Publishing Model Print
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: MEDLINE; Completed

Twenty-three top-level water polo players (WP) were examined for blood pressure (BP) response to graded and continuous cycle ergometry. Testing also included resting muscle biopsy for fiber typing, **exercise** ECG recording for heart **rate** (HR), **exercise concentrations** of blood **lactate** (LA), **measured** VO2max, and ratings of perceived **exertion** (RPE). A control group (C), whose subjects were physically active in endurance sports, but were older and less fit than the experimental subjects, was tested by an identical protocol. The BP response to **exercise** was significantly higher in the WP group at all comparison criteria including **onset of blood lactate accumulation**, absolute HR, percent of HRmax, and power loads (including loadless pedaling). To date, we are unaware of other reports on whole groups of sportsmen showing an exaggerated BP response to **exercise**. While it would appear from previous studies that normotensive individuals showing such a response are at a greater risk of developing hypertension, the significance of this BP response in highly-trained athletes in a specific sport remains unclear.

Record Date Created: 19840912
Record Date Completed: 19840912

44/7/6 (Item 6 from file: 5)

DIALOG(R)File 5:BIOSIS Previews(R)
(c) 2006 The Thomson Corporation. All rts. reserv.
0006103437 BIOSIS NO.: 198885072328

FIELD TESTS IN ROWING

AUTHOR: STEINACKER J M (Reprint); MICHALSKY R; GRUENERT-FUCHS M; LORMES W
AUTHOR ADDRESS: UNIVERSITAET ULM, SPORTMEDIZIN, OBERER ESELSBERG M25,
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JOURNAL: Deutsche Zeitschrift fuer Sportmedizin 38 (SPEC. ISSUE): p19-20,
22, 24-26 1987
ISSN: 0344-5925

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: GERMAN

ABSTRACT: Twelve elite oarsmen were tested on the Gjessing rowing ergometer with a multistage test. A fieldtest was performed in the boat to examine the practical relevance of this test; it was carried out over a 1000 meter distance with the speed increasing stepwise by raising the stroke frequency. Afterwards, long-distance rowing was carried out to check training intensity. In the field test, **lactate concentrations** were **measured** in capillary ear blood samples, the heart **rate** was **measured** telemetrically, boat speed and environmental conditions were **determined**. In the laboratory, the values **measured** on the ergometer were the power developed, oxygen consumption, heart **rate**, and **lactate concentrations**. The findings can be listed as follows: Work efficiency is higher in actual rowing than on the rowing ergometer. The heart **rate** /**lactate** relationship is comparable for both forms of **exercise**. The aerobic- **anaerobic threshold** is lower in the rowing field test than in the ergometer test. The heart **rate** /**lactate** relationship is nearly constant for long-distance rowing during training. Therefore, ergometer and field tests are useful for the control of training. By **calculating** heart **rate** /oxygen consumption relationships from the results of the ergometer tests, the individual strain of oarsmen in actual rowing can be computed out of heart **rate measurements**. **Anaerobic strain is assessed by lactate concentrations**. Fieldtesting in rowing requires great methodological **effort**, the results are greatly influenced by environmental factors. Fieldtests are only effective when conducted with technically perfect oarsmen.

44/7/7 (Item 7 from file: 155)

DIALOG(R)File 155:MEDLINE(R)
(c) format only 2006 Dialog. All rts. reserv.
07807268 PMID: 3172574

Comparison of objective methods for determining ventilatory threshold.

Fukuba Y; Munaka M; Usui S; Sasahara H
Department of Biometrics, Hiroshima University, Japan.

Japanese journal of physiology (JAPAN) 1988, 38 (2) p133-44, ISSN
0021-521X--Print Journal Code: 2985184R

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

This study was undertaken to compare and re-examine the relation of **lactate threshold** (LT) and ventilatory **threshold** (VT), using six objective **determination** methods proposed previously. Twenty-one young male subjects performed a cycle **exercise** test in which the work **rate** was increased by 150 kg.m every 2 min up to his limit of volitional fatigue. Through each test, gas exchange parameter **measurements** were made every 1 min (every 30 s at nearly maximal level), and the venous blood samples were taken from a warmed ear lobe at each work **rate** for **determining** blood **lactate concentration**. LT and its variance were **determined** by the intersecting straight lines regression. LT ranged from 0.72 to 1.40 l/min in terms of VO₂, and the mean value of S.D. for each LT was about 0.1 l/min. Each objective method for **determining** VT used in this study was based on the simple **modelling** of the criterion for visual detection of VT, that is the non-linear increase in VE or the systematic increase in VE/VO₂. When the relationship between LT and VT was examined, VT by the objective methods based on **determining** minimum value of VE/VO₂ showed relatively high consistency with LT. Of 16-20 individuals out of all 21 subjects, there were VT within LT +/- 0.2 in VO₂. It is concluded that VE/VO₂ is a more sensitive index for detecting VT than VE in the gas exchange parameters, and the objective VT **determination** method based on minimum value of VE/VO₂ could facilitate estimation of LT within an error of +/- 0.2 l/min VO₂ in most normal individuals.

Record Date Created: 19881103

Record Date Completed: 19881103

44/7/8 (Item 8 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

(c) format only 2006 Dialog. All rts. reserv.

08680714 PMID: 2178088

Beta-endorphin, adrenocorticotrophic hormone, cortisol and catecholamines during aerobic and anaerobic exercise .

Schwarz L; Kindermann W

Department of Sports and Performance Medicine, University of Saarland, Federal Republic of Germany.

European journal of applied physiology and occupational physiology (GERMANY) 1990, 61 (3-4) p165-71, ISSN 0301-5548--Print

Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Twelve non-specifically trained volunteers (aged 26.5 years, SD 3.6) performed exhausting incremental graded **exercise** (ST) and 1-min **anaerobic** cycle ergometer **exercise** (AnT) at 2-h intervals for the purpose of investigating beta-endorphin (beta-E) behaviour dependent on **exercise** intensity and **anaerobic** metabolism. In order to **determine** [beta-E], adrenocorticotrophic hormone [ACTH], cortisol [C], adrenaline [A] and noradrenaline [NA] **concentrations**, venous blood samples were collected prior and subsequent to **exercise** until the 20th min of the recovery period, as well as in ST before and after exceeding the individual **anaerobic threshold** (THan,i). Before, during and after ST, **lactate concentration**, heart **rate** and perceived degree of **exertion** were also

determined ; after AnT maximum **lactate concentration** was **measured** . Both types of **exercise** led to significant increases in [beta-E], [ACTH], [A] and [NA], with levels of [beta-E] and [ACTH] approximately twice as high after ST as after AnT. The [C] increased significantly only after ST. During ST significant changes in [beta-E] and [ACTH] were **measured** only after exceeding THAn,i. At all **measuring times** before and after ST and AnT both hormones correlated positively. In AnT the increases of [beta-E] and [A] demonstrated a correlation ($r = 0.65$; P less than 0.05). Both in AnT and ST there was a relationship between the maximum concentrations of beta-E and **lactate** ($r = 0.63$ and 0.71 ; each P less than 0.05). We therefore conclude that physical **exercise** with increasing or mostly **anaerobic** components leads to an increase in [beta-E], the extent correlating with the degree of **lactate concentration**. (ABSTRACT TRUNCATED AT 250 WORDS)

Record Date Created: 19910315

Record Date Completed: 19910315

44/7/10 (Item 10 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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09007114 PMID: 1951004

Effects of captopril on opioid peptides during exercise and quality of life in normal subjects.

Handa K; Sasaki J; Tanaka H; Kiyonaga A; Matsunaga A; Shindo M; Arakawa K
Department of Internal Medicine, School of Medicine, Fukuoka University, Japan.

American heart journal (UNITED STATES) Nov 1991, 122 (5) p1389-94,
ISSN 0002-8703--Print Journal Code: 0370465

Publishing Model Print

Document type: Clinical Trial; Journal Article; Randomized Controlled Trial

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

In a placebo-controlled, randomized, crossover, double-blind study of 17 normal volunteers, we examined the effects of captopril on the **concentration** of opioid peptides during bicycle **exercise** and on quality of life after a 2-week treatment period. Two **exercise** tests (progressive **exercise** and constant work **rate exercise**) were performed. Maximum oxygen uptake and blood **lactate concentrations** were **measured** in progressive **exercise** tests. The **exercise** intensities corresponding to a 1/2 **lactate threshold**, a **lactate threshold**, and a 4 mmol/L **lactate concentration** were **determined**. Constant work **rate exercise** at selected work loads for 20 minutes was carried out to **measure** the **concentrations** of opioid peptides and other hormones. Quality of life was assessed after the 2-week treatment period. Captopril treatment had no effect on the **exercise** response of blood pressure, heart **rate**, maximum VO_2 , and maximum work loads. The plasma **concentrations** of **lactate**, epinephrine, norepinephrine, and aldosterone increased during **exercise** and captopril did not change them. Beta-endorphin levels and plasma renin activity also increased during **exercise**, and the increases were greater with captopril treatment. Met-enkephalin and leu-enkephalin **concentrations** did not increase during **exercise**. According to responses in the quality of life questionnaires, administration of captopril improved the physiologic state more than the placebo did. These findings suggest that captopril may act on the central nervous system involving an increase in

the beta-endorphin level.

Record Date Created: 19911204

Record Date Completed: 19911204

44/7/11 (Item 11 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

(c) format only 2006 Dialog. All rts. reserv.

10320036 PMID: 7875143

Statistical evidence consistent with two lactate turnpoints during ramp exercise .

Morton R H; Fukuba Y; Banister E W; Walsh M L; Kenny C T; Cameron B J
Department of Statistics, Massey University, Palmerston North, New Zealand.

European journal of applied physiology and occupational physiology (GERMANY) 1994, 69 (5) p445-9, ISSN 0301-5548--Print Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

A number of studies have identified the existence of two ventilation thresholds during ramp or incremental exercise to exhaustion on the cycle ergometer. This study was undertaken to investigate whether two threshold turnpoints could be identified in blood lactate concentration data collected at such times. Five trained athletes provided serial blood samples on several occasions each during a 3-month period of training. Blood lactate concentration was analysed by fitting models with no, one or two turnpoints. Ordinary residuals from the first two models were often found to exhibit an oscillatory behaviour consistent with the existence of two turnpoints in lactate concentration. A comparative analysis of goodness of fit of these models revealed that the model with two turnpoints was significantly better than either of the simpler models. This suggests that two transitions exist, which divide the time domain for blood lactate concentration in ramp exercise into three regions. These two transitions may correspond to the two ventilation thresholds.

Record Date Created: 19950406

Record Date Completed: 19950406

44/7/12 (Item 12 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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10314950 PMID: 7867237

Cardiocirculatory and metabolic strain during rowing ergometry in coronary patients.

Urhausen A; Spieldenner J; Gabriel H; Schwarz L; Schwarz M; Kindermann W
Institute of Sports and Performance Medicine, University of Saarbrücken, Germany.

Clinical cardiology (UNITED STATES) Dec 1994, 17 (12) p652-6, ISSN 0160-9289--Print Journal Code: 7903272

Publishing Model Print

Document type: Clinical Trial; Journal Article; Randomized Controlled Trial

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

To investigate the suitability of rowing for cardiac rehabilitation, the cardiocirculatory and metabolic reactions during rowing (RE) and cycle (CE) ergometry were compared. Ten male normotensive subjects of an outpatient heart group (age 56 +/- 7 years, maximum performance on CE 2.0 +/- 0.4 W.kg⁻¹) carried out a stepwise increasing test on an isokinetic rowing ergometer and a CE (increasing by 25 W every 3 min). In a 1-min break after each step, heart rate and blood pressure, blood concentrations of lactate, and the free catecholamines adrenaline and noradrenaline were measured. Four patients showed signs of myocardial ischemia occurring almost one step earlier on RE than on CE. In RE, the endurance and maximum performance were about 20 W lower than on CE. At similar workloads, heart rate, blood pressure, and concentrations of lactate and catecholamines measured significantly higher on RE than on CE. At workloads above the individual anaerobic threshold, the increase in adrenaline and noradrenaline was significantly higher on RE than on CE. The results can be explained by the lower work efficiency, the higher isometric demands with increased cardiac pressure load, and the higher mental stress in RE. Rowing is only suitable in cardiac rehabilitation when well-defined prerequisites have been considered.

Record Date Created: 19950330

Record Date Completed: 19950330

44/7/13 (Item 13 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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10259816 PMID: 8001529

A method for determining the maximal steady state of blood lactate concentration from two levels of submaximal exercise .

Billat V; Dalmay F; Antonini M T; Chassain A P

Laboratory of Sports Science, University of Paris 12, Creteil, France.

European journal of applied physiology and occupational physiology (GERMANY) 1994, 69 (3) p196-202, ISSN 0301-5548--Print

Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The aim of this study was to estimate the characteristic exercise intensity (WCL) which produces the maximal steady state of blood lactate concentration (MLSS) from submaximal intensities of 20 min carried out on the same day and separated by 40 min. Ten fit male adults [maximal oxygen uptake (VO₂max) 62 (SD 7) ml.min⁻¹.kg⁻¹] exercised for two 30-min periods on a cycle ergometer at 67% (test 1.1) and 82% of VO₂max (test 1.2) separated by 40 min. They exercised 4 days later for 30 min at 82% of VO₂max without prior exercise (test 2). Blood lactate was collected for determination of lactic acid concentration every 5 min and heart rate and O₂ uptake (VO₂) were measured every 30 s. There were no significant differences at the 5th, 10th, 15th, 20th, 25th, or 30th min between VO₂, lactacidaemia, and heart rate during tests 1.2 and 2. Moreover, we compared the exercise intensities (WCL) which produced the MLSS obtained during tests 1.1 and 1.2 or during tests 1.1 and 2 calculated from differential values of lactic acid blood

concentration ([la-]b) between the 30th and the 5th min or between the 20th and the 5th min. There was no significant difference between the different values of WCL [68 (SD 9), 71 (SD 7, 73 (SD 6), 71 (SD 11)% of VO2max] (ANOVA test, $P < 0.05$). Four subjects ran for 60 min at their WCL **determined** from periods performed on the same day (test 1.1 and 1.2) and the difference between the [la-]b at 5 min and at 20 min (delta ([la-]b)) was computed. (ABSTRACT TRUNCATED AT 250 WORDS)

Record Date Created: 19950126

Record Date Completed: 19950126

44/7/14 (Item 14 from file: 94)

DIALOG(R) File 94:JICST-EPlus

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03628172 JICST ACCESSION NUMBER: 98A0456054 FILE SEGMENT: JICST-E

Monitoring of Blood Lactate Concentration during Physical Exercise with the Device "LACTATE PRO".

KUHARA MAKIHIKO (1); SATO YUJI (1); KONISHI RIKI (1); SUGIHARA KOFUMI (1); MAEKAWA YUICHI (1); KOBAYASHI EMI (1); OKUDA KIYOSHI (2)

(1) Osakafuritsukangodaigaku Iryogijutsutankidaigakubu; (2) Osaka City Univ., Med. Sch.

Osaka Furitsu Kango Daigaku Iryo Gijutsu Tanki Daigakubu Kiyo(Bulletin of Osaka Prefectural College of Health Sciences), 1997, VOL.3, PAGE.51-56, FIG.5, TBL.1, REF.8

JOURNAL NUMBER: L2594AAL ISSN NO: 1341-6421

UNIVERSAL DECIMAL CLASSIFICATION: 616-074

LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan

DOCUMENT TYPE: Journal

ARTICLE TYPE: Short Communication

MEDIA TYPE: Printed Publication

ABSTRACT: It was clarified that the use of **Lactate Pro** allows to **measure** the **concentration** of **lactic acid** in a short **time** by directly attracted to an electrode chip without applying any treatment such as glycolytic inhibitor on the sampled blood. This can detect an **anaerobic threshold** value (AT) or **lactic acid threshold** value (LT) in an exccercise tolerance test and eliminates any necessity of applying load. This has the advantage of securing a fixed variation coefficient irrelevant to the proficiency of techniques of an operator. However, the AT (LT) detection in the capillary did not reach the application stage by this research.

44/7/16 (Item 16 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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11960158 PMID: 9789858

Predicting competition performance in long-distance running by means of a treadmill test.

Roecker K; Schotte O; Niess A M; Horstmann T; Dickhuth H H
Universitat Tubingen, Medizinische Klinik und Poliklinik, Abteilung Sportmedizin, Germany. kai.roecker@uni-tuebingen.de

Medicine and science in sports and exercise (UNITED STATES) Oct 1998, 30 (10) p1552-7, ISSN 0195-9131--Print Journal Code: 8005433

Publishing Model Print; Erratum in Med Sci Sports Exerc 1998 Dec;30(12) 1750

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

PURPOSE: The purpose of this study was to examine the power of 16 parameters beside the individual **anaerobic threshold** (IAT) in predicting performance in various competition distances. METHODS: This study examined 427 competitive runners to test the prediction probability of the IAT and other parameters for various running distances. All runners (339 men, 88 women; ages, 32.5 +/- 10.14 yr; training, 7.1 +/- 5.53 yr; training distance, 77.9 +/- 35.63 km.wk-1) performed an increment test on the treadmill (starting speed, 6 or 8 km.h-1; increments, 2 km.h-1; increment duration, 3 min to exhaustion). The heart **rate** (HR) and the **lactate concentrations** in hemolyzed whole blood were **measured** at rest and at the end of each **exercise** level. The IAT was defined as the running speed at a net increase in **lactate concentration** 1.5 mmol.L-1 above the **lactate concentration** at LT. RESULTS: Significant correlations ($r = 0.88-0.93$) with the mean competition speed were found for the competition distances and could be increased using stepwise multiple regression ($r = 0.953-0.968$) with a set of additional parameters from the training history, anthropometric data, or the performance diagnostics. CONCLUSIONS: The running speed at a defined net **lactate** increase thus produces an increasing prediction accuracy with increasing distance. A parallel curve of the identity straight lines with the straight lines of regression indicates the independence of at least a second independent performance **determining factor**.

Record Date Created: 19981218

Record Date Completed: 19981218

44/7/17 (Item 17 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

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11865990 PMID: 9694318

Heart rate deflection compared to 4 mmol x l(-1) lactate threshold during incremental exercise and to lactate during steady-state exercise on an arm-cranking ergometer in paraplegic athletes.

Schmid A; Huonker M; Aramendi J F; Kluppel E; Barturen J M; Grathwohl D; Schmidt-Trucksass A; Berg A; Keul J

University of Freiburg, Centre for Internal Medicine, Department of Preventive and Rehabilitative Sports Medicine, Germany.

European journal of applied physiology and occupational physiology (GERMANY) Jul 1998, 78 (2) p177-82, ISSN 0301-5548--Print

Journal Code: 0410266

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

The deflection point (DP) of the heart **rate** in relation to the work **rate** (WR) of 8 male endurance-trained paraplegics and 11 male physically active sports students was investigated during nonsteady-state incremental arm cranking ergometry (IT) and compared to the 4 mmol x l(-1) blood **lactate concentration threshold** and to blood **lactate concentration** in steady-state **exercise** (SST). Heart **rate**, and **lactate concentration** from capillary blood, were **determined** at rest, during IT and SST. The DP was **calculated** by linear regression analysis of the heart **rate** during IT. The SST consisted of three consecutive **exercise** intensities over a period

of 8 min at **exercise** intensities of 10 W below, and at 10 W above the work **rate** at deflection point (WRDP). No difference was found between the paraplegics and non-handicapped subjects regarding heart **rate** and blood **lactate concentration** at rest and during **exercise**. A DP was established in all the paraplegics and in 72.7% of the non-handicapped subjects, but **lactate accumulation** was observed in 75% of the paraplegics and in 62.5% of the non-handicapped subjects at the lowest intensity of SST. In summary, endurance-trained paraplegics with an injury level below T5 showed heart **rate** and blood **lactate concentration** values comparable to non-handicapped subjects during IT. A linear increase at moderate **exercise** intensities and a levelling-off at higher to maximal intensities could be identified in all the paraplegics and in 72.7% of non-handicapped subjects. The **determination** of the **anaerobic threshold** by DP should be applied with caution, since no causal relationship of DP and the **anaerobic threshold** was found and the WRDP tended to overestimate **threshold** values.

Record Date Created: 19981030

Record Date Completed: 19981030

44/7/19 (Item 19 from file: 155)

DIALOG(R)File 155:MEDLINE(R)

(c) format only 2006 Dialog. All rts. reserv.

12361530 PMID: 10204407

Field exercise testing for assessing fitness in French standardbred trotters.

Courouce A

Departement de Medecine du Sport, C.H. de Laval, France.
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Veterinary journal (London, England - 1997) (ENGLAND) Mar 1999, 157

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This review considers standardized **exercise** testing which is, routinely used for French Trotters in the field. Track testing provides a more limited range of **measurements** than treadmill testing, but has the advantage of being performed in the horse's natural environment. Various **measurements** such as heart **rate** during **exercise** and blood **lactate concentration** after **exercise** may be **measured** on the track and lead to the **calculation** of physiological variables such as V200 (velocity corresponding to a 200 bpm heart **rate**) and V4 (velocity corresponding to a 4 mmol/L blood **lactate concentration**). V4 is related to the **onset** of blood **lactate accumulation** and relates to the aerobic capacity of the horse, as horses with high values for V4 have higher aerobic capacities. Although V4 is **calculated** during submaximal intensity **exercise**, it is related to racing performance and seems to be the most important **measurement** to assess changes in fitness. V200 represents the cardiac capacity of the horse during **exercise** and is close to V4 in mature horses. To explain further the clinical usefulness of track testing, and to help interpret both V4 and V200 variables, examples of **exercise** tests in 3-year-old French Trotters are presented here. These results show that changes may occur in V4 and V200 according to different factors such as the horse's physical ability and either training or disease states. It underlines the importance of

exercise tests for both trainers and veterinarians and how they may help in the evaluation of a horse's performance ability; in defining the intensity of a training program, and also in the early detection of underlying diseases. (50 Refs.)

Record Date Created: 19990429

Record Date Completed: 19990429

File 239:Mathsci 1940-2006/Nov

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Set	Items	Description
S1	2	(ANAEROBIC OR LACTATE OR LACTIC()ACID) ()THRESHOLD? ? OR ON- SET(1W)BLOOD() (LACTATE OR LACTIC()ACID) ()ACCUMULATION
S2	2	(LACTIC()ACID OR LACTATE) (2N) (ACCUMULAT? OR CONCENTRAT????)
S3	160119	RATE? ? OR KINETICS OR DYNAMICS
S4	247893	TIME
S5	162374	MEASUR??? OR MEASUREMENT? ?
S6	212532	DETERMIN??? OR CALCULAT?
S7	4	S1:S2

7/7/3

DIALOG(R)File 239:Mathsci

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02220000 CIS 9101871

Comment on ``Determination of anaerobic threshold '' (V16 p307-316)

Routledge, R. D.

Canad. J. Statist. CandJSt (CIS abbrev)

The Canadian Journal of Statistics, 1991, 19, 233-239

Language: English

Document Type: Journal

Subfile: CIS (Current Index to Statistics) ASA/IMS

7/7/4

DIALOG(R)File 239:Mathsci

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01998769 CIS 8803652

Determination of ' anaerobic threshold

Bennett, G. W.

Canad. J. Statist. CandJSt (CIS abbrev)

The Canadian Journal of Statistics, 1988, 16, 307-316

Language: English

Document Type: Journal

Subfile: CIS (Current Index to Statistics) ASA/IMS

File 149:TGG Health&Wellness DB(SM) 1976-2006/Sep W1
 (c) 2006 The Gale Group
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Set	Items	Description
S1	507	(ANAEROBIC OR LACTATE OR LACTIC()ACID)()THRESHOLD? ? OR ON-SET(1W)BLOOD() (LACTATE OR LACTIC()ACID)()ACCUMULATION
S2	1003	(LACTIC()ACID OR LACTATE) (2N) (ACCUMULAT? OR CONCENTRAT????)
S3	5982181	RATE? ? OR KINETICS OR DYNAMICS
S4	10367726	TIME
S5	2808584	MEASUR??? OR MEASUREMENT? ?
S6	2861475	DETERMIN??? OR CALCULAT?
S7	3262747	FORMULA? ? OR EQUATION? ? OR MODELL??? OR MODEL???
S8	4617742	STRESS OR EXERT??? OR EXERCIS??? OR EFFORT? ?
S9	70	S1(S)S2
S10	70	RD (unique items)
S11	5	S10/2001
S12	9	S10/2002
S13	8	S10/2003
S14	6	S10/2004
S15	6	S10/2005
S16	1	S10/2006
S17	35	S10 NOT S11:S16
S18	16	S17(S)S3
S19	13	S17(S)S4
S20	30	S17(S)S8
S21	33	S18:S20
S22	33	Sort S21/ALL/PD,A
S23	9	S5()S2
S24	1	S6()S2
S25	4	S7(1N)S2
S26	0	S1(S)S23:S25
S27	13	S23:S25 NOT S9
S28	12	RD (unique items)
S29	12	Sort S28/ALL/PD,A

22/3,K/3 (Item 3 from file: 149)
 DIALOG(R)File 149:TGG Health&Wellness DB(SM)

(c) 2006 The Gale Group. All rts. reserv.
01237865 SUPPLIER NUMBER: 08477828 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Just pump I.T. (interval training)

De Mond, Troy E.

American Fitness, v8, n3, p28(3)

May-June, 1990

PUBLICATION FORMAT: Magazine/Journal ISSN: 0893-5238 LANGUAGE: English

RECORD TYPE: Fulltext TARGET AUDIENCE: Consumer

WORD COUNT: 1507 LINE COUNT: 00129

... One must remember when attempting to increase the **exercise** intensity above the **anaerobic threshold**, the greatest **concentration** for increased oxygen and carbon dioxide exchange occurs. It is at this level of intensity the **accumulation** of **lactic acid** tends to be the greatest. The build-up of **lactic acid** will hinder muscular contraction and overall physical performance. However, if the intensity is decreased for a brief period of **time**, recovery occurs because the body's ability to utilize oxygen and deliver nutrients to the working muscles increases. The use of weights, **exercise** bands, tubing (see diagram), or even calisthenics during recovery periods are excellent ways to increase...

22/3,K/9 (Item 9 from file: 149)

DIALOG(R)File 149:TGG Health&Wellness DB(SM)

(c) 2006 The Gale Group. All rts. reserv.

01486959 SUPPLIER NUMBER: 15679734 (USE FORMAT 7 OR 9 FOR FULL TEXT)

Assessment of physical performance. (ABC of Sports Medicine)

Williams, Clyde

British Medical Journal, v309, n6948, p180(5)

July 16, 1994

PUBLICATION FORMAT: Magazine/Journal ISSN: 0959-8146 LANGUAGE: English

RECORD TYPE: Fulltext; Abstract TARGET AUDIENCE: Professional

WORD COUNT: 2271 LINE COUNT: 00211

... sparingly. A training induced decrease in carbohydrate metabolism is reflected by lower blood and muscle **lactate concentrations** during **exercise**. One way of assessing endurance fitness therefore is to **measure** the changes in blood **lactate concentrations** during submaximum **exercise** of increasing intensity and thus identify the "**lactate threshold**" or "**anaerobic threshold**"--the **exercise** intensity at which the aerobic energy production is no longer sufficient to cover the demands production.

Blood **lactate concentrations** and **exercise** intensity

Rather than attempt to detect the **lactate threshold** for athletes during routine testing, which would require an excessive amount of blood sampling, **lactate** reference values can be used. For example, blood **lactate concentrations** of 2 mmol/l and 4 mmol/l are used routinely for assessing changes in endurance or aerobic fitness. The rise in blood **lactate concentration** during **exercise** of increasing intensity is delayed after training, whereas after a prolonged period of inactivity or illness **lactate concentrations** increase significantly earlier in **exercise**. Routine assessments can be carried out without the need to perform exhausting **exercise** or to **measure** the maximum oxygen uptake because the results can be expressed as an **exercise** intensity at, for example, a **lactate concentration** of 2 mmol/l. This approach to assessing aerobic fitness is particularly attractive in a clinical setting when dealing with people whose health status does not permit **exercise** to exhaustion.

[CHART OMITTED]

Protocol for assessing blood **lactate** responses to submaximum

exercise.

The running...
... Ventilation **rate** and **exercise** intensity
The **anaerobic threshold** can also be assessed non-invasively by recording changes in ventilation **rate** during **exercise** of increasing intensity. The "ventilatory **threshold**" is the point at which there is a non-linear increase in ventilatory **rate** in relation to oxygen consumption. Although this approach to assessing aerobic fitness is attractive, the inflection point in the ventilatory responses to **exercise** is not always as detectable or sufficiently reproducible to recommend its **measurement** as routine procedure...
...definition of endurance or aerobic fitness is that it is an individual's highest relative **exercise** intensity before producing a blood **lactate concentration** of 2 mmol/l. This definition allows the endurance fitness of everyone to be compared...

22/3,K/11 (Item 11 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2006 ProQuest Info&Learning. All rts. reserv.
01042751 96-92144
Respirator mask effects on exercise metabolic measures
Johnson, Arthur T; Dooly, Cathryn R; Dotson, Charles O
American Industrial Hygiene Association Journal v56n5 PP: 467-473 May 1995
ISSN: 0002-8894 JRNL CODE: AIH
WORD COUNT: 4382
ABSTRACT: To test the effects of respirator masks on maximum oxygen uptake, ventilation **threshold**, and **lactate threshold**, 14 subjects underwent incremental bicycle **exercise** with and without masks. There was a statistically significant difference in final oxygen consumption between...
...termination for the full-mask condition. Hypoventilation while wearing masks caused higher amounts of blood **lactate accumulation**. The resulting higher mask CO2 levels and low O2 levels, normally attributed to mask dead...

22/3,K/14 (Item 14 from file: 149)
DIALOG(R)File 149:TGG Health&Wellness DB(SM)
(c) 2006 The Gale Group. All rts. reserv.
01648574 SUPPLIER NUMBER: 18812704 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Effect of physical training on exercise capacity and gas exchange in patients with chronic heart failure.
Kiilavuori, Kai; Sovijarvi, Anssi; Naveri, Hannu; Ikonen, Timo; Leinonen, Hannu
Chest, v110, n4, p985(7)
Oct, 1996
PUBLICATION FORMAT: Magazine/Journal ISSN: 0012-3692 LANGUAGE: English
RECORD TYPE: Fulltext TARGET AUDIENCE: Professional
WORD COUNT: 4214 LINE COUNT: 00367
... from the cephalic vein at rest, at the end of each workload, and at peak **exercise** during the graded **exercise** test. During the endurance test, the samples were taken before the start and at the end and, in addition, at 3 and 6 months also at the point of **time** equal to the duration of this test at 0 months. Blood **lactate** level was **determined**...
...ethylenedianediamine tetraacetic acid blood, which was frozen on dry ice

immediately after sampling.(16) The **anaerobic threshold** was determined graphically from an abrupt increase in blood **lactate concentration** using log-log transformation method.(17)

Hemodynamic Measurements

Central hemodynamic parameters were measured in supine...

22/3,K/15 (Item 15 from file: 149)

DIALOG(R)File 149:TGG Health&Wellness DB(SM)

(c) 2006 The Gale Group. All rts. reserv.

01682471 SUPPLIER NUMBER: 19261264 (USE FORMAT 7 OR 9 FOR FULL TEXT)

Dangerous curves: a perspective on exercise, lactate and the anaerobic threshold.

Myers, Jonathan; Ashley, Euan

Chest, v111, n3, p787(9)

March, 1997

PUBLICATION FORMAT: Magazine/Journal ISSN: 0012-3692 LANGUAGE: English

RECORD TYPE: Fulltext TARGET AUDIENCE: Professional

WORD COUNT: 7481 LINE COUNT: 00630

... While they acknowledge that **lactate** production is also dependent on the glycolytic and mitochondrial respiration **rates** as well as LDH, they propose that oxygen supply has the most pivotal role in...

...the redox state. These metabolic compensations depend on cell

(PO.sub.2), but the glycolytic **rate** is not directly coupled to (O.sub.2) supply. **Lactate accumulation** may occur both above and below a critical

(PO.sub.2) since it depends not only on the glycolytic **rate** but also on exchange across the cell membrane and consumption in neighboring cells.

These investigators have observed **lactate** formation at low levels of **exercise** ((is less than) 10% (VO.sub.2) max) in dog gracillis muscle (a purely aerobic...

...that **lactate** formation cannot be due to an (O.sub.2) limitation, and that the **anaerobic threshold** cannot apply to red muscle.

These two sources seem to directly contrast one another. In...

...is an important factor controlling **lactate** production. This is evidenced by high correlations between catecholamine **concentration** and blood **lactate** ,(38-40) by similar **threshold** responses for **lactate** and catecholamines,4041 by studies demonstrating that...

...44) and by the observation that (Beta)-blockade causes a reduction in blood **lactate** during **exercise** .(19,45,46) Mazzeo and Marshall(40) have shown that the inflection point during incremental **exercise** for plasma epinephrine shifts in an identical manner and simultaneously with **lactate** from cycling to...

...these findings by observing similar norepinephrine and epinephrine **thresholds** between running and rowing, but the **lactate threshold** occurred at a lower oxygen uptake (7 and 10% lower for running and cycling, respectively...

...47) suggest that it may not be an epinephrine **threshold** per se that underlies the **lactate threshold** , but rather a critical plasma epinephrine level.

An additional persuasive argument put forth involves the...a long history. Recent studies have made the long-held cause and effect relationship between **lactate accumulation** and ventilatory changes another source of debate. In 1975, Wasserman and associates(58) appeared... chemoreceptors to detect changes in pH caused by **lactic acid** production, no ventilatory changes during **exercise** were observed. In the 1980s, however, a wide variety of experimental manipulations have raised

questions...

...example, numerous studies have demonstrated that the ventilatory **threshold** can be detected prior to the **lactate threshold** during progressive **exercise** .(59-61) In addition, nonlinear increases in ventilation have been observed among subjects who do...

...but associated **thresholds**, one for ventilation and one for **lactate**.

Evidence also exists that the **lactate threshold** correlates well with an electromyogram (EMG) "**threshold**" (abrupt increases in the frequency band width at...

...the possibility that an increase in neural activity, originating from higher motor centers or the **exercising** muscle, may contribute to the stimulation of ventilation. Mateika and Duffin(77) attenuated peripheral chemoreceptor activity with hyperoxic breathing, and observed coincident ventilatory and EMG **thresholds** during **exercise** . These investigators have also shown that, during normoxic breathing, EMG and ventilatory **thresholds** occur at similar **exercise** intensities, whereas the **lactate** and ventilatory **thresholds** are uncoupled.(78) These data suggest that changes in **lactate concentration** and thus peripheral chemoreceptor drive are not strictly responsible for the ventilatory **threshold**, but rather...at rest, both with and without the availability of oxygen. It is now recognized that **lactate accumulates** in the blood for several reasons, not just the fact that oxygen supply to the...

...inadequate. **Lactate** production and removal is a continuous process; it is a change in the **rate** of one or the other that **determines** the blood **lactate** level. Rather than a specific **threshold**, there is most likely a period of **time** during which **lactate** production begins to exceed the body's capacity to remove it (through buffering or oxidation in other fibers). It may be appropriate to replace the term "**anaerobic threshold**" to a more functional description, since the muscles are never entirely **anaerobic** nor is there...

...among others has been suggested) **Lactate** plays a major role as a metabolic substrate during **exercise** , is the preferred fuel for slow-twitch muscle fibers, and is a precursor for liver...

22/3,K/16 (Item 16 from file: 149)
DIALOG(R)File 149:TGG Health&Wellness DB(SM)
(c) 2006 The Gale Group. All rts. reserv.
01766262 SUPPLIER NUMBER: 20580985 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Aerobic endurance training program improves exercise performance in lung

transplant recipients.
Stiebellehner, Leopold; Quittan, Michael; End, Adelheid; Wieselthaler, Georg; Klepetko, Walter; Haber, Paul; Burghuber, Otto C.
Chest, v113, n4, p906(7)
April, 1998

PUBLICATION FORMAT: Magazine/Journal; Refereed ISSN: 0012-3692
LANGUAGE: English RECORD TYPE: Fulltext TARGET AUDIENCE: Professional
WORD COUNT: 4197 LINE COUNT: 00388

... the endurance training. Resting spirometry was performed before each **exercise** test.

(Figure 1 ILLUSTRATION OMITTED)

Exercise studies were performed using a symptom-limited, incremental cycle ergometer protocol. Pedaling at 50 to 60 rpm, the work **rate** was increased every 3 min by 20 W from an initial load of 20 W...
...2) was **measured** with a fast-response zirconium-oxide analyzer (Servomex-Taylor; Fussex, UK). The **anaerobic threshold** was **determined**

using the V-slope technique. (13) Samples of whole blood were taken from the hyperemic earlobe at rest, at the last 20 s of each work **rate**, and at maximal **exercise** with a 50-(micro)L capillary to assess Pa(O₂) (AVL 995; AVL List GesmbH; Graz, Austria) and with a 20-(micro)L capillary to assess **lactate concentration** (ESAT 6661; Eppendorf Geraetebau Ges.m.b.H.; Hamburg, Germany). The heart **rate** from a 12-lead ECG (Schiller AG; Baar, Switzerland) was recorded continuously at rest and throughout **exercise**.

We also wished to assess if changes at an identical, submaximal workload after the period...

22/3,K/18 (Item 18 from file: 149)

DIALOG(R) File 149:TGG Health&Wellness DB(SM)

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01826792 SUPPLIER NUMBER: 54271842 (USE FORMAT 7 OR 9 FOR FULL TEXT)

HOW DO DIET AND EXERCISE INFLUENCE THE AMOUNT OF LACTIC ACID IN BREAST MILK?

Quinn, Timothy J.; Carey, Gale B.

Nutrition Research Newsletter, 18, 3, 10(1)

March, 1999

PUBLICATION FORMAT: Newsletter ISSN: 0736-0037 LANGUAGE: English

RECORD TYPE: Fulltext TARGET AUDIENCE: Academic; Professional

WORD COUNT: 440 LINE COUNT: 00038

In an attempt to more clearly define the relationship between **exercise**, diet, and **lactic acid concentration** in breast milk, Timothy Quinn and Gale Carey of the University of New Hampshire conducted...
...were drawn from the subjects before and after a non**exercise** or control session, a maximal **exercise** session, an **exercise** session designed to reach the predetermined **lactic acid threshold** (LAT) for each woman, and a 20% below the **lactic acid threshold** (LAT-20%) session. All sessions lasted for 30 minutes...

22/3,K/20 (Item 20 from file: 149)

DIALOG(R) File 149:TGG Health&Wellness DB(SM)

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01864472 SUPPLIER NUMBER: 55942338 (USE FORMAT 7 OR 9 FOR FULL TEXT)

Lactate is an unreliable indicator of tissue hypoxia in injury or sepsis. (Hypothesis)

James, J Howard; Luchette, Fred A; McCarter, Freda D; Fischer, Josef E

The Lancet, 354, 9177, 505

August 7, 1999

PUBLICATION FORMAT: Magazine/Journal ISSN: 0099-5355 LANGUAGE: English

RECORD TYPE: Fulltext; Abstract TARGET AUDIENCE: Professional

WORD COUNT: 4186 LINE COUNT: 00363

... we shall discuss, epinephrine **concentrations** in sepsis or after injury frequently exceed these **thresholds**.

During **exercise** of increasing intensity, plasma **lactate concentration** increases gradually at low work levels, but then increases rapidly as **exercise** increases to higher work intensity. The intensity at which **lactate** begins abruptly to increase is often called the **lactate threshold** or **anaerobic threshold**, (14) suggesting that, at some work level, oxygen delivery becomes inadequate to meet metabolic demand. Circulating epinephrine **concentration** also rises with increasing **exercise** intensity; at maximum **exercise** intensity in trained athletes (runners or

cyclists) epinephrine **concentrations** may reach 1500-2500 pg/mL. (15) During **exercise**, oxygen saturation of muscle myoglobin remained stable at high **exercise** intensity and correlated poorly with circulating **lactate concentration**. (16) However, several **exercise** studies have shown excellent correlation between **concentrations** of plasma **lactate** and epinephrine. (13,15-17) These observations suggest that the **lactate threshold** during **exercise** reflects increased aerobic glycolysis, stimulated by the rising epinephrine **concentration** rather than **anaerobic glycolysis** due...

22/3,K/22 (Item 22 from file: 149)
DIALOG(R)File 149:TGG Health&Wellness DB(SM)
(c) 2006 The Gale Group. All rts. reserv.
01869080 SUPPLIER NUMBER: 57562619 (USE FORMAT 7, OR 9 FOR FULL TEXT)
Exercise Limitation Testing. (Statistical Data Included) (Letter to the Editor)

Whitney, John F.; Levy, Robert D.
Chest, 116, 4, 1141
Oct, 1999

DOCUMENT TYPE: Statistical Data Included; Letter to the Editor
PUBLICATION FORMAT: Magazine/Journal; Refereed ISSN: 0012-3692
LANGUAGE: English RECORD TYPE: Fulltext TARGET AUDIENCE: Professional
WORD COUNT: 804 LINE COUNT: 00072
... article by Ramos-Barbon et al (February 1999) (1) seems to limit the analysis of **exercise** limitation to simply a cardiovascular or a ventilatory endpoint. In their analysis, if a specific heart **rate** (HR) or ventilatory limitation does not exist, the patient must have given submaximal **effort** or have deconditioning as the cause. In fact, many other endpoints exist that are readily...
...or a Swan-Ganz catheter are not needed). Many heart failure patients have poorly detectable **anaerobic thresholds** (AT) when noninvasive means are used to detect. Traditionally, the solution would be to place...
...experience, obtaining an arterial blood gas (ABG) with a **lactate** level at the end of **exercise** will provide you with an abundance of information to show whether the patient in question was giving full **effort** and whether the AT was crossed. In many patients without apparent HR or ventilatory limitation, the ABG will show compensated metabolic acidosis with significant arterial **lactate concentrations**, which suggests that the **effort** was full. It still leaves the question of deconditioning vs cardiac limitation technically unanswered but...

22/3,K/23 (Item 23 from file: 149)
DIALOG(R)File 149:TGG Health&Wellness DB(SM)
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02913902 SUPPLIER NUMBER: 64387460 (USE FORMAT 7 OR 9 FOR FULL TEXT)
A comparison of two protocols used to determine the effect of age on selected variables which influence endurance running performance.

Theakston, S.C.; Davison, R.C.R.; Bird, S.R.
Journal of Sports Sciences, 18, 1, 42
Jan, 2000

PUBLICATION FORMAT: Magazine/Journal ISSN: 0264-0414 LANGUAGE: English
RECORD TYPE: Fulltext TARGET AUDIENCE: Professional
WORD COUNT: 569 LINE COUNT: 00050

... to ensure that each participant could complete at least five stages. During each test, heart **rate** (HR), oxygen consumption

((VO.sub.2)) and capillary blood **lactate concentration** were measured continuously (at 5 s, 30 s and 4 min intervals, respectively). Lung function, body composition, blood haemoglobin **concentration** and haematocrit were also assessed before the test. The **lactate threshold** ((T.sub.lac)) was defined as a sudden rise in, or a disproportionately large non-linear increase in, blood **lactate concentration** (Brooks, 1985: Medicine and Science in Sports and **Exercise**, 17, 22-31). Performance and the physiological parameters measured for each protocol were then correlated...

22/3,K/24 (Item 24 from file: 149)
DIALOG(R)File 149:TGG Health&Wellness DB(SM)
(c) 2006 The Gale Group. All rts. reserv.
02913898 SUPPLIER NUMBER: 64387456 (USE FORMAT 7 OR 9 FOR FULL TEXT)
The relationship between accumulated oxygen deficit and anaerobic capacity estimated from maximal incremental treadmill exercise.
Romer, L.M.; Humphrey, S.; Ramsay, R.
Journal of Sports Sciences, 18, 1, 39
Jan, 2000
PUBLICATION FORMAT: Magazine/Journal ISSN: 0264-0414 LANGUAGE: English
RECORD TYPE: Fulltext TARGET AUDIENCE: Professional
WORD COUNT: 902 LINE COUNT: 00075
TEXT:

...defined as the maximal amount of ATP resynthesized via **anaerobic** metabolism, is important for maximal **exercise** of short duration (Green, 1994: European Journal of Applied Physiology, 69, 168-173). Although **accumulated**...
...to be the most theoretically acceptable estimate of **anaerobic** capacity (Saltin, 1990: In Biochemistry of **Exercise** VII, edited by A. Taylor et al., pp. 387-412. Champaign, IL: Human **Kinetics**), several alternative indices obtainable from maximal incremental **exercise** have also been proposed. These include: the length of **time** a maximum oxygen uptake plateau is maintained (t-(VO.sub.maxplat)); the change in oxygen uptake from **lactate threshold** to ((VO.sub.max) ((Delta) (VO.sub.2))); the maximum respiratory exchange ratio during a test ((RER.sub.max)); the maximum **rate** of carbon dioxide production ((VCO.sub.2max)); and the post-test maximum blood **lactate concentration** (((La.sup.-)).sub.Bmax)). The aim of the present study was to examine the relationship...
...criterion **measure** (AOD) and several indirect indices of **anaerobic** capacity obtained from maximal incremental treadmill **exercise** in distance runners.
... by) (min.sup.-1)) distance runners participated in the study. They performed a discontinuous incremental **exercise** protocol on a motorized treadmill (Powerjog M30, Birmingham, UK), which involved a mean of six **exercise** stages (range 5-7) with treadmill speed increased by 0.17 m (multiplied by) (s...
...earlobe during 30 s rest between each incremental stage for subsequent **determination** of whole-blood **lactate concentration** (Analox GM7, London, UK). Oxygen uptake was **measured** breath-by-breath using an automated on...
...system (Mijnhardt Oxycon Champion, Bunnik, Netherlands); (VO.sub.2) during the fourth minute of each **exercise** intensity was used to **determine** an individual (VO.sub.2)-speed regression (r = 0.994...
...ml (multiplied by) (kg.sup.-1) (multiplied by) (min.sup.-1)). After **determination** of the **lactate threshold**, treadmill speed was held constant and the gradient was increased by 1% each minute until...
...sup.-1) and 0%, respectively. Blood was sampled at 0, 3 and 6 min post-**exercise** and analysed for **lactate**. After 1.5 h of rest, AOD was assessed

as the difference between the predicted supramaximal oxygen uptake and the actual oxygen uptake during **time** to exhaustion. The participants ran at 110-130% of $\dot{V}O_{2\max}$ and 1% gradient to elicit an overall test **time** of 2-3 min (mean **time** to exhaustion = 153 (+ or -) 35 s). The $\dot{V}O_{2\max}$ was **determined** from a...
...gradient tangent to an exponential function fitting the breath-by-breath ($\dot{V}O_{2\max}$) data. **Lactate threshold** was defined as the oxygen uptake corresponding to the first occurrence of an increase of...
...1) from baseline that was followed by a similar or larger increase during the next **exercise** increment (Coyle et al., 1983: Journal of Applied Physiology, 54, 18-23). The ($\dot{V}O_{2\max}$...

22/3,K/25 (Item 25 from file: 149)
DIALOG(R)File 149:TGG Health&Wellness DB(SM)
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02913894 SUPPLIER NUMBER: 64387452 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Heart and blood lactate relationships between kayaking and kayak ergometry.
Oliver, J.E.R.
Journal of Sports Sciences, 18, 1, 37
Jan, 2000
PUBLICATION FORMAT: Magazine/Journal ISSN: 0264-0414 LANGUAGE: English
RECORD TYPE: Fulltext TARGET AUDIENCE: Professional
WORD COUNT: 744 LINE COUNT: 00062
... 1) and K4 = 96 stroke (multiplied by) (min.sup.-1).
Our results show that blood **lactate concentration** is higher in a K4 than on a kayak ergometer when **exercising** at the individual **anaerobic threshold**, using heart **rate determined** from a graded **exercise** test on a kayak ergometer. Blood **lactate concentration** was also higher in the K1 than on the kayak ergometer, but not significantly. As with blood **lactate**, ratings of perceived **exertion** were significantly higher in the K4 than on the kayak ergometer; although ratings of perceived **exertion** were higher in the K1 than on the kayak ergometer, the difference was not significant. The results show that care must be taken when prescribing heart **rates** from a kayak ergometer for steady-state training on the water in a K1 or a K4, as training on the water results in increased blood **lactate concentrations**. Therefore, prescribing heart **rates** for training intensities relative to those of the individual **anaerobic threshold** from a kayak ergometer may result in over- or under-training across different kayaking disciplines...

22/3,K/26 (Item 26 from file: 149)
DIALOG(R)File 149:TGG Health&Wellness DB(SM)
(c) 2006 The Gale Group. All rts. reserv.
02913892 SUPPLIER NUMBER: 64387450 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Does critical swimming velocity represent the velocity at lactate threshold in elite triathletes?
Martin, L.; Whyte, G.P.
Journal of Sports Sciences, 18, 1, 36
Jan, 2000
PUBLICATION FORMAT: Magazine/Journal ISSN: 0264-0414 LANGUAGE: English
RECORD TYPE: Fulltext TARGET AUDIENCE: Professional
WORD COUNT: 569 LINE COUNT: 00048
TEXT:
...157). In competitive swimmers, critical velocity has been reported

to be equivalent to a blood **lactate concentration** of 4 mmol (multiplied by) (l.sup.-1) (Wakayoshi et al., 1993: European Journal of Applied Physiology, 66, 90-95). In terms of endurance performance, blood **lactate concentrations** of 4 mmol (multiplied by) (l.sup.-1) may not be sustainable indefinitely without fatigue. Previously, the **determination** of critical velocity in swimming has used a series of **time** -trials covering distances from 100 m to 400 m (multiplied by) (s.sup.-1) Furthermore, protocols to **determine** blood **lactate concentrations** in swimming have relied on self-paced swimming, which ultimately may not provide accurate steady...
...nature of the sport. The present study aimed to identify the influence of long-distance **time** -trials on critical velocity and to compare critical velocity with velocity at the **lactate threshold** .
... all combinations of these.

Critical velocity was similar regardless of the combination or number of **time** -trials used in the linear regression. For all participants, critical velocity was significantly (P (is less than) 0.05) faster than the velocity at the **lactate threshold** (1.23 (+ or -) 0.11 and 1.15 (+ or -) 0.10 m (multiplied by) (sup.-1) respectively). Blood **lactate concentrations** were significantly higher (P (is less than) 0.05) at critical velocity (3.0 (+ or -) 1.0 mmol (multiplied by) (l.sup.-1)) than at the **lactate threshold** (1.9 (+ or -) 0.4 mmol (multiplied by) (l.sup.-1)). **Lactate concentrations** were lower in the present study than those reported by Wakayoshi et al. (1992).

The...

22/3,K/27 (Item 27 from file: 149)
DIALOG(R)File 149:TGG Health&Wellness DB(SM)
(c) 2006 The Gale Group. All rts. reserv.
02913879 SUPPLIER NUMBER: 64387437 (USE FORMAT 7 OR 9 FOR FULL TEXT)
A comparison of power output recorded by an SRM powercrank and Kingcycle test rig.

Balmer, J.; Davison, R.C.R.; Coleman, D.A.; Bird, S.R.
Journal of Sports Sciences, 18, 1, 27

Jan, 2000

PUBLICATION FORMAT: Magazine/Journal ISSN: 0264-0414 LANGUAGE: English

RECORD TYPE: Fulltext TARGET AUDIENCE: Professional

WORD COUNT: 805 LINE COUNT: 00060

... by) (min.sup.-1). Each participant completed a maximal aerobic power (MAP) test, an incremental **onset** of **blood lactate accumulation** test (OBLA), and a laboratory-based simulated 16 km **time** -trial (16TT). For the MAP test, work **rate** was increased each minute by 5.0 (+ or -) 0.2% of maximal aerobic power derived...

...1 min rest in between increments, with starting power **calculated** to be 45% MAP. Work **rate** was increased by 24 W per stage until volitional exhaustion. For the 16TT, the participants...

...the highest power output recorded for 1 min during the test (n = 12). For the **onset** of **blood lactate accumulation** , mean power output was **calculated** for the fourth minute of each stage (n = 90) and for 16TT the average power output for the complete **time** -trial was **calculated** (n = 12).

The mean ((+ or -) s) power output for the MAP and...

22/3,K/29 (Item 29 from file: 149)
DIALOG(R)File 149:TGG Health&Wellness DB(SM)
(c) 2006 The Gale Group. All rts. reserv.

02913943 SUPPLIER NUMBER: 64387501 (USE FORMAT 7 OR 9 FOR FULL TEXT)

Correlates of simulated hill climb cycling performance.

DAVISON, R.C. RICHARD; SWAN, DAVID; COLEMAN, DAMIAN; BIRD, STEVE

Journal of Sports Sciences, 18, 2, 105

Feb, 2000

PUBLICATION FORMAT: Magazine/Journal ISSN: 0264-0414 LANGUAGE: English

RECORD TYPE: Fulltext TARGET AUDIENCE: Professional

WORD COUNT: 4288 LINE COUNT: 00354

... the participants' own bicycles. During both hill climbs, the cyclists' sustained intensities considerably above the **lactate threshold** and, for the 1-km climb, considerably above the maximal aerobic power recorded on the...

...in our laboratory, it appears that these intensities are not sustainable for similar amounts of **time** on the cycle ergometer, suggesting that higher power outputs are achievable during a climb than on the flat. It is interesting to note that we have recorded higher blood **lactate concentrations** ((is greater than) 13 mmol (multiplied by) (1.sup.-1)) after 17.5 min of a 16-km **time** -trial on a cycle ergometer (Balmer et al., 1999), just slightly longer than the duration of the 6-km 6% climb. The lower **lactate concentrations** during the higher-intensity climb may be due to lower circulation of the **lactate** produced as a result of the lower cadences. Nevertheless, these high power outputs and **lactate concentrations**, together with the fact that the strongest individual predictor of hill climb performance was average...

22/3,K/30 (Item 30 from file: 149)

DIALOG(R) File 149:TGG Health&Wellness DB(SM)

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02913955 SUPPLIER NUMBER: 64387513 (USE FORMAT 7 OR 9 FOR FULL TEXT)

Changes in blood lactate and pyruvate concentrations and the lactate-to-pyruvate ratio during the lactate minimum speed test.

CARTER, HELEN; JONES, ANDREW M.; DOUST, JONATHAN H.

Journal of Sports Sciences, 18, 3, 213

March, 2000

PUBLICATION FORMAT: Magazine/Journal ISSN: 0264-0414 LANGUAGE: English

RECORD TYPE: Fulltext TARGET AUDIENCE: Professional

WORD COUNT: 7871 LINE COUNT: 00653

... minimum speed being defined as the minimum point on the curve); (2) a standard incremental **exercise** test without prior sprint **exercise** for **determination** of the **lactate threshold**; and (3) the sprint **exercise** followed by a passive recovery. The **lactate** minimum speed (12.0 (+ or -) 1.4 km (multiplied by) (h.sup.-1)) was significantly slower than running speed at the **lactate threshold** (12.4 (+ or -) 1.7 km (multiplied by) (h.sup.-1)) (P (is less than) 0.05), but there were no significant differences in (VO.sub.2), heart **rate** or blood **lactate concentration** between the **lactate** minimum speed and running speed at the **lactate threshold**. During the standard incremental test, blood **lactate** and the **lactate-to-pyruvate** ratio increased above baseline values at the same **time**, with pyruvate increasing above baseline at a higher running speed. The **rate** of **lactate**, but not pyruvate, disappearance was increased during **exercising** recovery (early stages of the **lactate** minimum speed incremental test) compared with passive recovery. This...

...baseline in the standard incremental test. Although these results suggest that the mechanism for blood **lactate accumulation** at the **lactate** minimum speed and the **lactate threshold** may be the same,

disruption to normal submaximal **exercise** metabolism as a result of the preceding sprint **exercise**, including a three- to five-fold elevation of plasma pyruvate **concentration**, makes it difficult to interpret the blood **lactate** response to the **lactate** minimum speed test. Caution should be **exercised** in the use of this test for the assessment of endurance capacity.

Keywords: endurance capacity...

...as the highest running speed or power output at which a balance exists between the **rate** of appearance of **lactate** in the blood and the **rate** of removal of **lactate** from the blood during constant-load **exercise** (Heck et al., 1985; Beneke and Von Duvillard, 1996). It is a strong predictor of endurance **exercise** performance in athletes (Haverty et al., 1998; Jones and Doust, 1998). However, the assessment of the maximal **lactate** steady state is **time**-consuming and involves the completion of 4-6 constant-load **exercise** bouts of approximately 30 min duration on separate days. There are several methods for the assessment of the blood **lactate** response to a single incremental **exercise** test, which are often preferred to the direct assessment of the maximal **lactate** steady state. These methods, which include assessment of the **lactate threshold** (Wasserman et al., 1973) or the **lactate** turnpoint (Hoffman et al., 1994), and interpolation to an absolute blood **lactate concentration** such as 4 mmol (multiplied by) (1.sup.-1) (Heck et al., 1985), have been...

...state. Identification of the **lactate** minimum speed involves: (a) a brief period of high-intensity **exercise** to invoke an increase in blood **lactate concentration**; (b) an 8-min rest to allow for the movement of **lactate** from the **exercised** muscle to the bloodstream; and (c) a standard multi-stage **exercise** test, with blood samples taken for the analysis of **lactate concentration** at the end of each **exercise** stage. Because the incremental portion of this test starts when participants have high blood **lactate concentrations** (typically 6-8 mmol (multiplied by) (1.sup.-1)), the incremental test produces a characteristic...

...determined objectively by a horizontal line that is tangent to a spline fit to the **exercise** blood **lactate** data, theoretically represents a point of balance between processes of **lactate** production and...

...Tegtbur et al. showed that running at the **lactate** minimum speed could be sustained without **accumulation** of blood **lactate**; running at a speed only 0.7 km (multiplied by) (h.sup.-1) above the **lactate** minimum speed resulted in significant **accumulation** of blood **lactate** over **time**. Furthermore, **lactate** minimum speed was not affected by glycogen depletion (Tegtbur et al., 1993). In...

...no more than a 1.0 mmol (multiplied by) (1.sup.-1) increase in blood **lactate concentration** between 10 and 30 min of a series of constant-speed treadmill runs. However, the **lactate** minimum speed was not significantly different from the running speed at the **lactate threshold** and was significantly correlated with 8 km running performance in 13 athletes ($r = 0.83$...

...test may be useful in the objective assessment of the blood **lactate** response to progressive **exercise**.

The physiological mechanisms underpinning the concept of the **lactate** minimum speed remain to be **determined**...

...was kept constant and the treadmill grade was increased by 1% each minute. During this **time**, expired air was collected in Douglas bags over sequential periods of approximately 30 s. The highest ($\text{VO}_{2\text{sub}2}$) **measured** during this **time** was recorded as ($\text{VO}_{2\text{sub}2\text{max}}$). This procedure has been shown to provide a valid **measure** of ($\text{VO}_{2\text{sub}2\text{max}}$) (Jones and Doust, 1996b). **Plots of blood lactate concentration against running speed and**

(VO.sub.2) were distributed to two independent reviewers who **determined the lactate : threshold** as the first sustained increase in blood **lactate** above baseline (Wasserman et al., 1973). The...
...s to facilitate blood sampling. It has been shown that the running speed and heart **rate** at the **lactate threshold** and at reference blood **lactate concentrations** are not altered significantly when breaks of up to 30 s are allowed between **exercise** stages of 4 min duration (Gullstrand et al., 1994).

The participant's fingertip was cleaned...
...standard deviation unless otherwise indicated. Stepwise regression was used to establish the factors affecting the **rate** of **lactate** clearance in the recovery period following the sprints. Four physiological parameters were entered into the regression: (VO.sub.2) at the **lactate threshold**, blood **lactate concentration** at the **lactate threshold**, (VO.sub.2max), and blood **lactate concentration** after the sprints.

Results

Comparison of **lactate** minimum and **lactate threshold**

The **lactate** minimum speed...
...km (multiplied by) (h.sup.-1)) was significantly slower than the running speed at the **lactate threshold** (12.4 (+ or -) 1.7 km (multiplied by) (h.sup.-1)) (P (is less than...
...see Table 1). However, there were no significant differences between the **lactate** minimum and the **lactate threshold** in terms of (VO.sub.2) (2.43 (+ or -) 0.48 vs 2.51 (+ or -) 0.501 (multiplied by) (min.sup.-1)), heart **rate** (167 (+ or -) 15 vs 168 (+ or -) 11 beats (multiplied by) (min.sup.-1)) or blood **lactate concentration** (2.1 (+ or -) 0.5 vs 1.9 (+ or -) 0.4 mmol (multiplied by) (1...
...running speeds during the **lactate** minimum speed test and the standard incremental test, but heart **rate** was typically 2-5 beats (multiplied by) (min.sup.-1) higher during the **lactate** minimum...
...a similar **rate**.

In the **lactate** minimum speed test (test 3; see Fig. 3), blood **lactate concentration** fell from 5.6 (+ or -) 0.9 mmol (multiplied by) (1.sup.-1) at **time** 0 to reach a minimum of 2.1 (+ or -) 0.5 mmol (multiplied by) (1...
...10 min into the test, before increasing again until the test was terminated. Thus, blood **lactate concentration** reached a minimum at a running speed that was similar to the running speed at the **lactate threshold** determined from the standard incremental test (Fig. 1). Plasma pyruvate **concentration** increased slightly between **time** 0 and 5 min into the test, after which it decreased to a minimum at...
...incremental test (Fig. 1). The **lactate-to-pyruvate** ratio reached a minimum at a similar **time** (10 min) to that at which blood **lactate concentration** was at a minimum.

For clarity, the mean responses to the three tests are presented...
...exception of running speed, the physiological variables assessed in this study ((VO.sub.2), heart **rate**, blood **lactate concentration**) were not significantly different between the **lactate** minimum speed and the **lactate threshold**. In a previous study, Jones and Doust (1998) reported that the **lactate** minimum speed was not significantly different from running speed at the **lactate threshold**, although both were significantly lower than the running speed at the maximal **lactate** steady state...
...and the **lactate-to-pyruvate** ratio remained at resting levels for the first 2-3 **exercise** stages. As running speed increased, blood **lactate concentration** and the **lactate -to-pyruvate** ratio increased at the same **time**; that is, there was a 'threshold' in the ratio as blood **lactate** rose

above baseline. Plasma pyruvate typically remained at resting levels for an additional one or two **exercise** stages before displaying a **threshold** increase above baseline values. These results are similar to those of Wasserman et al. (1985). The increase in blood **lactate concentration**, without a simultaneous increase in blood pyruvate **concentration**, may indicate an alteration in the cell...

...**accumulation** (Wasserman et al., 1985; Katz and Sahlin, 1988; Pianosi et al., 1995). That the **rate** of increase in pyruvate above the pyruvate **threshold** was not as steep as the **rate** of increase in **lactate** throughout the **exercise** test, and that pyruvate continued to increase in the early part of recovery causing the...

...Wasserman et al. (1985). Whether the increase in the **lactate-to-pyruvate** ratio at the **lactate threshold** implies the development of hypoxia during submaximal **exercise** is beyond the scope of this paper; interested readers are directed to the works of...

...In the present study, analysis of the changes in blood **lactate** during recovery from sprint **exercise** began after 8 min of walking recovery. Blood **lactate** had reached a peak **concentration** at...

...and active recovery (**lactate** minimum speed test) because blood **lactate** was seen to fall over **time** in both these conditions from minute 8 (**time** 0' in Fig. 4). Blood **lactate** typically peaks after 3-5 min of recovery after maximal incremental **exercise** tests (Stamford et al., 1981; Bishop and Martino, 1993), and there is evidence to ...1986). Freund and Zouloumian (1981) reported that changes in blood **lactate** during recovery from heavy **exercise** could be modelled using two exponential terms: the first described the initial rise in blood...

...fall in **lactate** towards resting levels. As we did not assess the blood **lactate** evolution **kinetics** in the early part of recovery, the decline in blood **lactate** we observed from 8...

...period is consistent with previous reports (Freund and Zouloumian, 1981; Freund et al., 1984). The **time** taken for blood **lactate concentration** to be halved in this period was approximately 20 min, supporting the suggestion that blood **lactate** returns to resting levels within 40-60 min of the end of heavy **exercise** (Casaburi et al., 1995). In our study, multiple regression analysis revealed that the factor that explained the most variance in the **rate** of **lactate** disappearance was the initial blood **lactate concentration**. This supports the hypothesis that the uptake of **lactate** from the blood by skeletal and cardiac muscle is, in large part, driven by the **lactate concentration** gradient (Gladden, 1989; Stainsby and Brooks, 1990). The predictive power of the multiple regression **equation** was improved further only with the addition of the running speed at the **lactate threshold**. A high **lactate threshold** has been associated with a greater capillary density (Tesch and Wright, 1983; Coyle et al...
...the mode of recovery (i.e. active vs passive).

Plasma pyruvate remained significantly above resting **concentrations** throughout the **lactate** minimum speed test (Fig. 5), and the **lactate-to-pyruvate** ratio decreased during the early stages of the test as a consequence of the slower **rate** of disappearance of pyruvate compared with that of **lactate** (Fig. 6). The **lactate-to-pyruvate**...

...6). This suggests that the physiological mechanism responsible for the **lactate** minimum speed and the **lactate threshold** is the same; however, we believe that this interpretation should be made with caution.

A...

...but that it was also influenced by the overall blood **lactate** recovery **kinetics**.

The sprint **exercise** that precedes the incremental phase of the

lactate minimum speed test presents a unique situation that may severely disrupt normal submaximal **exercise** metabolism. Sprint **exercise** causes the **accumulation** of **lactate** , (H.sup.+) and ammonia (Oyono-Enguelle et al., 1992), muscle glycogen depletion, and elevation of...
...could result in changes in blood flow distribution and motor unit recruitment patterns during subsequent **exercise** . One explanation why the **lactate** minimum speed was significantly lower than the running speed at the **lactate threshold** in the present study, and in a previous study with different protocols (Carter et al...
...at the **lactate** minimum speed was not significantly different from (VO.sub.2) at the **lactate threshold** . However, the disruption to submaximal **exercise** metabolism caused by the preceding sprint **exercise** -- including elevated plasma pyruvate and possible changes in motor unit recruitment patterns, blood flow distribution, and the effective distribution space and **concentration** gradients for **lactate** -- make it difficult to interpret the meaning of changes in blood **lactate concentration** during the **lactate** minimum speed test. The results of Carter et al. (1999), which demonstrated a positive linear...
...suggests that similar values for the **lactate** minimum speed and the running speed at the **lactate threshold** may be coincidental. Continued uncertainty regarding the physiological mechanisms underpinning the **lactate** minimum concept suggests that caution should be **exercised** in the use of the **lactate** minimum speed test for the assessment of endurance capacity...

29/7/3 (Item 3 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB

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05155679 SUPPLIER NUMBER: 10588552 (THIS IS THE FULL TEXT)

NEC and NDMC develop system for simple measurement of blood sugar.

(National Defense Medical College)

COMLINE: Biotechnology and Medical Industry of Japan, CBI910122003

Jan 22, 1991

TEXT:

NEC and NDMC Develop System for Simple **Measurement** of Blood Sugar
Tokyo-based NEC Corp. <6701> and Professor Makoto Kikuchi of the School of Medicine at the National Defense Medical College (NDMC) have jointly developed a system to **measure** blood sugar without the invasive procedure of blood sampling by syringe.

The system consists of an aspirator to obtain a drop of blood from the arm, and a biosensor consisting of two pH electrodes, one of which is coated by immobilized glucose oxidase. When the sensor is placed in the drop of blood, the enzyme catalyzes oxidation of the blood glucose. This alters the pH around the enzyme-bound electrode. The difference in pH readings between the two electrodes can be used to estimate the blood glucose **concentration** in the short time of 20 seconds.

According to an NEC spokesman, the system can be adapted to simultaneously **measure lactic acid concentration** . The company expects to commercialize the system in four years.

Contact: NEC; Tel: +81-3-3454-1111; Fax: +81-3-3457-7249

NDMC; Tel +81-429-95-1211

Ref: Nikkei Sangyo Shimbun, 01/21/91, p.5

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File 350:Derwent WPIX 1963-2006/UD=C200659

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File 347:JAPIO Dec 1976-2005/Dec(Updated 060404)

(c) 2006 JPO & JAPIO

Set	Items	Description
S1	42	(ANAEROBIC OR LACTATE OR LACTIC()ACID)()THRESHOLD? ? OR ON-SET(1W)BLOOD() (LACTATE OR LACTIC()ACID)()ACCUMULATION
S2	493	(LACTIC()ACID OR LACTATE) (2N) (ACCUMULAT? OR CONCENTRAT????)
S3	883723	RATE? ? OR KINETICS OR DYNAMICS
S4	3168267	TIME
S5	1481471	MEASUR??? OR MEASUREMENT? ?
S6	1620390	DETERMIN??? OR CALCULAT?
S7	1225815	FORMULA? ? OR EQUATION? ? OR MODELL??? OR MODEL???
S8	408317	STRESS OR EXERT??? OR EXERCIS??? OR EFFORT? ?
S9	88844	IC=A61B-005?
S10	356311	IC=G06F-017?
S11	3	S1 AND S2 [1 duplicate; 2 too recent]
S12	12	S5()S2
S13	4	S6()S2
S14	1	S7(1N)S2
S15	12	S12:S14 NOT S1
S16	1	S3:S4 AND S15
S17	11	S15 NOT (S11 OR S16)
S18	22	S2 AND S3 AND S4
S19	208153	THRESHOLD? ?
S20	0	S18 AND S19
S21	2	S18 AND S8
S22	2	S21 NOT (S11 OR S16 OR S15) [too recent]
S23	20	S18 NOT (S11 OR S15:S16 OR S21) [not relevant]
S24	0	S9:S10 AND S23

16/5/1 (Item 1 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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0010921334

WPI ACC NO: 2001-543101/200161

XRAM Acc No: C2001-162179

XRPX Acc No: N2001-403792

Assessing exercise-related lactate concentration comprises using mathematical model to determine lactate concentration from heart rate data

Patent Assignee: HEIKKILA I (HEIK-I); POLAR ELECTRO OY (POLA-N)

Inventor: HEIKKILA I; HEIKKILAE I; HEIKKILAE L

Patent Family (9 patents, 27 countries)

Patent			Application			
Number	Kind	Date	Number	Kind	Date	Update
EP 1127543	A1	20010829	EP 2001660034	A	20010219	200161 B
US 20010020135	A1	20010906	US 2001792268	A	20010223	200161 E
FI 200000417	A	20010824	FI 2000417	A	20000223	200169 E
US 6411841	B1	20020625	US 2001792268	A	20010223	200246 E
FI 114201	B1	20040915	FI 2000417	A	20000223	200461 E
EP 1127543	B1	20051130	EP 2001660034	A	20010219	200579 E
DE 60115301	E	20060105	DE 60115301	A	20010219	200612 E
			EP 2001660034	A	20010219	
ES 2250334	T3	20060416	EP 2001660034	A	20010219	200631 E
DE 60115301	T2	20060608	DE 60115301	A	20010219	200638 E

EP 2001660034 A 20010219
Priority Applications (no., kind, date): EP 2001660034 A 20010219; FI
2000417 A 20000223

Patent Details

Number	Kind	Lan	Pg	Dwg	Filing Notes
EP 1127543	A1	EN	19	4	
Regional Designated States, Original: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR					
FI 114201	B1	FI			Previously issued patent FI 200000417
EP 1127543	B1	EN			
Regional Designated States, Original: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR					
DE 60115301	E	DE			Application EP 2001660034 Based on OPI patent EP 1127543
ES 2250334	T3	ES			Application EP 2001660034 Based on OPI patent EP 1127543
DE 60115301	T2	DE			Application EP 2001660034 Based on OPI patent EP 1127543

Alerting Abstract EP A1

NOVELTY - Method for assessing **exercise-related lactate concentration** in a human body comprises **measuring** a person's heart **rate**, inputting one or more heart **rate** parameters into a mathematical **model**, and outputting the resulting **lactate concentration** to a display.

DESCRIPTION - An INDEPENDENT CLAIM is also included for a heart **rate measuring** apparatus comprising a heart **rate** monitor, a computer for assessing **lactate concentration** from heart **rate** data, and a **lactate concentration** display.

USE - The method is useful for monitoring **lactate** levels during and after **exercise**.

ADVANTAGE - No blood samples are required.

Class Codes

International Classification (Main): A61B, A61B-005/02, A61B-005/024, A61B-005/04, A61B-005/22

(Additional/Secondary): A61B-005/0205, A63B-024/00, G06F-017/00

International Classification (+ Attributes)

IPC + Level Value Position Status Version

A61B-0005/22 A I F 20060101

A61B-0005/22 A I F B 20060101

G06F-0017/00 A I L 20060101

G06F-0017/00 A I L B 20060101

US Classification, Issued: 600513000, 600513000

17/5/6 (Item 6 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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0008557126

WPI ACC NO: 1998-090965/

XRAM Acc No: C1998-030775

XRPX Acc No: N1998-072204

Measuring lactic acid concentration in urine and blood - involves regression analysis of detected signal using computer for determining lactic acid concentration

Patent Assignee: KYOTO DAIICHI KAGAKU KK (KYOT-N)

Inventor: OKUDA H; OTSUKA K

Patent Family (1 patents, 1 countries)

Patent			Application			
Number	Kind	Date	Number	Kind	Date	Update
JP 9318626	A	19971212	JP 1996175368	A	19960531	199809 B

Priority Applications (no., kind, date): JP 1996175368 A 19960531

Patent Details

Number	Kind	Lan	Pg	Dwg	Filing	Notes
JP 9318626	A	JA	6	4		

Alerting Abstract JP A

Measuring lactic acid concentration in urine and blood involves irradiating visible light or near IR light on a specimen enclosed in a container (13) from a light source (11). The wavelength of the irradiated light is selected so that the absolute value of a correlating coefficient and absorbence level is ≥ 0.9 when visible light is used and ≥ 0.5 when IR light is used. A detector (14) receives the light reflected by the specimen and outputs a detected signal. Then, a computer receives the detected signal via a signal processing interface and **lactic acid concentration** is **determined** by regression analysis.

ADVANTAGE - Use of reagent and test paper is prevented. Preprocessing of urine is eliminated.

Class Codes

International Classification (Main): G01N-033/493
(Additional/Secondary): G01N-021/35, G01N-033/50

File 350:Derwent WPIX 1963-2006/UD=200659
(c) 2006 The Thomson Corporation
File 347:JAPIO Dec 1976-2005/Dec(Updated 060404)
(c) 2006 JPO & JAPIO
File 324:German Patents Fulltext 1967-200637
(c) 2006 Univentio
File 349:PCT FULLTEXT 1979-2006/UB=20060914UT=20060907
(c) 2006 WIPO/Thomson
File 348:EUROPEAN PATENTS 1978-2006/ 200637
(c) 2006 European Patent Office

Set	Items	Description
S1	33	AU='STEGMANN H' OR AU='STEGMANN HEINER':AU='STEGMANN HEINER FRIEDRICH EBERT ANLAGE 25 6345'
S2	3	AU='STEGMANN, HEINER':AU='STEGMANN, HEINER, FRIEDRICH-EBER- T-ANLAGE 25, 6'
S3	33	S1 OR S2
S4	33	IDPAT (sorted in duplicate/non-duplicate order)
S5	27	IDPAT (primary/non-duplicate records only)

5/3,AB,IC/2 (Item 2 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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0010501813

WPI ACC NO: 2001-102785/

XRPX Acc No: N2001-076277

**Method to adjust or control diet of sports person, or ill or old person;
involves controlling consumption of carbohydrates, fats or protein on basis
of person's individual performance potential**

Patent Assignee: STEGMANN H (STEG-I)

Inventor: **STEGMANN H**

4 patents, 24 countries

Patent Family

Patent			Application			
Number	Kind	Date	Number	Kind	Date	Update
WO 2001000091	A1	20010104	WO 2000EP6060	A	20000629	200111 B
AU 200058218	A	20010131	AU 200058218	A	20000629	200124 E
DE 19949479	A1	20010111	DE 19949479	A	19991014	200124 E
EP 1196087	A1	20020417	EP 2000943938	A	20000629	200233 E
			WO 2000EP6060	A	20000629	

Priority Applications (no., kind, date): DE 19929508 A 19990629; DE
19949479 A 19991014

Patent Details

Number	Kind	Lan	Pg	Dwg	Filing	Notes
WO 2001000091	A1	DE	13	0		
National Designated States,Original: AE AU JP NZ US						
Regional Designated States,Original: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE						
AU 200058218	A	EN				Based on OPI patent WO 2001000091
EP 1196087	A1	DE				PCT Application WO 2000EP6060 Based on OPI patent WO 2001000091
Regional Designated States,Original: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE						

Alerting Abstract WO A1

NOVELTY - The method involves controlling the consumption of
carbohydrates, fats, or proteins, taking into consideration the person's
individual performance potential. Characteristic parameters of the

performance are determined and used as the bases for substrate mixture ratios for the diet or nutrition programme to be followed.

USE - To adjust or control a person's diet or consumption. For sports person or ill or old person.

ADVANTAGE - Simple measurements enable a person's dietary requirements to be properly met.

Class Codes

International Classification (Main): A61B-005/22

(Additional/Secondary): A61B-005/00, A61B-005/02

5/3,AB,IC/3 (Item 3 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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0010410369

WPI ACC NO: 2001-008280/200102

XRPX Acc No: N2001-006070

Determining human resilience from concentration measurements above individual anaerobic threshold on lactate performance curve, derives difference in gradients for comparison with earlier, other individual or standard results

Patent Assignee: STEGMANN H (STEG-I)

Inventor: STEGMANN H

7 patents, 23 countries

Patent Family

Patent Number	Kind	Date	Application Number	Kind	Date	Update
DE 19909852	A1	20000914	DE 19909852	A	19990308	200102 B
AU 200038094	A	20000928	AU 200038094	A	20000308	200102 E
WO 2000053091	A1	20000914	WO 2000EP2030	A	20000308	200102 E
EP 1158897	A1	20011205	EP 2000916909	A	20000308	200203 E
			WO 2000EP2030	A	20000308	
EP 1158897	B1	20050126	EP 2000916909	A	20000308	200510 E
			WO 2000EP2030	A	20000308	
DE 50009357	G	20050303	DE 50009357	A	20000308	200517 E
			EP 2000916909	A	20000308	
			WO 2000EP2030	A	20000308	
US 6899676	B1	20050531	WO 2000EP2030	A	20000308	200536 E
			US 2001926129	A	20011207	

Priority Applications (no., kind, date): DE 19909852 A 19990308

Patent Details

Number	Kind	Lan	Pg	Dwg	Filing Notes
DE 19909852	A1	DE	6	5	
AU 200038094	A	EN			Based on OPI patent WO 2000053091
WO 2000053091	A1	DE			
National Designated States,Original: AE AU JP NZ US					
Regional Designated States,Original: AT BE CH CY DE DK ES FI FR GB GR IE					
IT LU MC NL PT SE					
EP 1158897	A1	DE			PCT Application WO 2000EP2030
					Based on OPI patent WO 2000053091
Regional Designated States,Original: AT BE CH CY DE DK ES FI FR GB GR IE					
IT LI LU MC NL PT SE					
EP 1158897	B1	DE			PCT Application WO 2000EP2030
					Based on OPI patent WO 2000053091
Regional Designated States,Original: AT BE CH CY DE DK ES FI FR GB GR IE					
IT LI LU MC NL PT SE					

DE 50009357	G	DE	Application EP 2000916909
			PCT Application WO 2000EP2030
			Based on OPI patent EP 1158897
			Based on OPI patent WO 2000053091
US 6899676	B1	EN	PCT Application WO 2000EP2030
			Based on OPI patent WO 2000053091

Alerting Abstract DE A1

NOVELTY - Lactate concentration variation is measured as a function of time, above the individual anaerobic threshold. A curve is fitted to the measured values, lactate concentration being plotted against time. A first gradient of the measured curve is determined at an instant in time (tIAT) corresponding to one of the individual anaerobic thresholds. A further gradient is determined from the curve at instant (tx), which follows tIAT. The second gradient is subtracted from the first, determining a difference DeltaA.

USE - To determine human resilience (toughness, ability to work under pressure)

ADVANTAGE - The method allows further characteristic performance data to be derived for humans. Stored curves of the difference DeltaA can be compared with values obtained at different times for the same-, or different individuals. They can be compared with standard values, producing ratings.

DESCRIPTION OF DRAWINGS - A lactate-performance curve demonstrates the gradients measured.

tIAT Time corresponding to an individual anaerobic threshold

tx Moment in time following tIAT

Class Codes

International Classification (Main): A61B-005/00, A61B-005/22
(Additional/Secondary): A61B-005/145

5/3,AB,IC/6 (Item 6 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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0007383928

WPI ACC NO: 1995-303115/199540

XRPX Acc No: N1995-230227

Method of determining anaerobic threshold in humans by measuring ventilation parameters - involves calculating value from formula comprising pulmonary capacity, its CO2 and O2 content parameters and plotting against time

Patent Assignee: STEGMANN H (STEG-I)

Inventor: STEGMANN H

11 patents, 60 countries

Patent Family

Patent			Application			
Number	Kind	Date	Number	Kind	Date	Update
DE 4406286	A1	19950831	DE 4406286	A	19940226	199540 B
WO 1995022929	A1	19950831	WO 1995EP711	A	19950227	199540 E
AU 199518122	A	19950911	AU 199518122	A	19950227	199550 E
EP 742693	A1	19961120	EP 1995909788	A	19950227	199651 E
			WO 1995EP711	A	19950227	
JP 9509345	W	19970922	JP 1995522143	A	19950227	199748 E
			WO 1995EP711	A	19950227	
EP 742693	B1	19971126	EP 1995909788	A	19950227	199801 E
			WO 1995EP711	A	19950227	

DE 59501042	G	19980108	DE 59501042	A	19950227	199807	E
			EP 1995909788	A	19950227		
			WO 1995EP711	A	19950227		
AU 685596	B	19980122	AU 199518122	A	19950227	199811	E
ES 2113188	T3	19980416	EP 1995909788	A	19950227	199822	E
NZ 281235	A	19980427	NZ 281235	A	19950227	199823	E
			WO 1995EP711	A	19950227		
US 5782772	A	19980721	WO 1995EP711	A	19950227	199836	E
			US 1996696975	A	19961220		

Priority Applications (no., kind, date): DE 4406286 A 19940226

Patent Details

Number	Kind	Lan	Pg	Dwg	Filing	Notes
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DE 4406286	A1	DE	4	2		
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WO 1995022929	A1	DE	20	3		
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National Designated States, Original: AM AT AU BB BG BR BY CA CH CN CZ DE
 DK EE ES FI GB GE HU JP KE KG KP KR KZ LK LR LT LU LV MD MG MN MW MX NL
 NO NZ PL PT RO RU SD SE SI SK TJ TT UA US UZ VN

Regional Designated States, Original: AT BE CH DE DK ES FR GB GR IE IT KE
 LU MC MW NL OA PT SD SE SZ UG

AU 199518122	A	EN			Based on OPI patent	WO 1995022929
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EP 742693	A1	DE	4	2	PCT Application	WO 1995EP711
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Based on OPI patent WO 1995022929

Regional Designated States, Original: AT BE CH DE DK ES FR GB GR IE IT LI
 LU MC NL PT SE

JP 9509345	W	JA	19		PCT Application	WO 1995EP711
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Based on OPI patent WO 1995022929

EP 742693	B1	DE	9	3	PCT Application	WO 1995EP711
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Based on OPI patent WO 1995022929

Regional Designated States, Original: AT BE CH DE DK ES FR GB GR IE IT LI
 LU MC NL PT SE

DE 59501042	G	DE			Application	EP 1995909788
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PCT Application WO 1995EP711

Based on OPI patent EP 742693

Based on OPI patent WO 1995022929

AU 685596	B	EN			Previously issued patent	AU 9518122
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Based on OPI patent WO 1995022929

ES 2113188	T3	ES			Application	EP 1995909788
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Based on OPI patent EP 742693

NZ 281235	A	EN			PCT Application	WO 1995EP711
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Based on OPI patent WO 1995022929

US 5782772	A	EN			PCT Application	WO 1995EP711
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Based on OPI patent WO 1995022929

Alerting Abstract DE A1

The method depends on work done per time unit, the parameters being pulmonary capacity (Ve), CO2 content of pulmonary capacity (VC02) and O2 content of pulmonary capacity (VO2). The work load per time unit is increased in predetermined increments while simultaneously measuring the pulmonary capacity and its CO2 and O2 contents. According to the relation :

$$x = Ve / ((VC02)^2 \cdot VO2)^{1/3}$$

the value of x is calculated on the basis of the measurements and plotted over time t. By joining the values of x during a specific exercise, a curve is obtained, the turning point of which indicates the anaerobic threshold of the test person.

The ventilation parameters may be determined when the work load is increased step by step or continuously.

ADVANTAGE - Eliminates taking of blood samples and measuring of blood

lactate, while giving great accuracy.

Class Codes

International Classification (Main): A61B-005/08, A61B-005/083, A61B-005/22
(Additional/Secondary): G06F-017/60

File 16:Gale Group PROMT(R) 1990-2006/Sep 19
 (c) 2006 The Gale Group
 File 160:Gale Group PROMT(R) 1972-1989
 (c) 1999 The Gale Group
 File 148:Gale Group Trade & Industry DB 1976-2006/Sep 20
 (c)2006 The Gale Group
 File 47:Gale Group Magazine DB(TM) 1959-2006/Sep 19
 (c) 2006 The Gale group
 File 149:TGG Health&Wellness DB(SM) 1976-2006/Sep W1
 (c) 2006 The Gale Group
 File 635:Business Dateline(R) 1985-2006/Sep 20
 (c) 2006 ProQuest Info&Learning
 File 636:Gale Group Newsletter DB(TM) 1987-2006/Sep 19
 (c) 2006 The Gale Group
 File 441:ESPICOM Pharm&Med DEVICE NEWS 2006/Apr W1
 (c) 2006 ESPICOM Bus.Intell.
 File 129:PHIND(Archival) 1980-2006/Sep W2
 (c) 2006 Informa UK Ltd
 File 135:NewsRx Weekly Reports 1995-2006/Sep W2
 (c) 2006 NewsRx
 Set Items Description
 S1 0 HEINER()STEGMANN

File 155:MEDLINE(R) 1950-2006/Sep 20
 (c) format only 2006 Dialog
 File 5:Biosis Previews(R) 1969-2006/Sep W3
 (c) 2006 The Thomson Corporation
 File 73:EMBASE 1974-2006/Sep 20
 (c) 2006 Elsevier B.V.
 File 34:SciSearch(R) Cited Ref Sci 1990-2006/Sep W2
 (c) 2006 The Thomson Corp
 File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
 (c) 2006 The Thomson Corp
 File 91:MANTIS(TM) 1880-2006/Jan
 2001 (c) Action Potential
 File 164:Allied & Complementary Medicine 1984-2006/Sep
 (c) 2006 BLHCIS
 File 467:ExtraMED(tm) 2000/Dec
 (c) 2001 Informania Ltd.
 Set Items Description
 S1 82 AU='STEGMANN H' OR AU='STEGMANN HEINER'
 S2 10 AU='STEGMANN H.'
 S3 835687 ANAEROBIC OR LACTATE OR LACTIC()ACID
 S4 11 S1:S2 AND S3
 S5 7 RD (unique items)
 S6 7 Sort S5/ALL/PY,A

6/9/2 (Item 2 from file: 155)
 DIALOG(R)File 155:MEDLINE(R)
 (c) format only 2006 Dialog. All rts. reserv.
 05689628 PMID: 7333753 Record Identifier: 82141281
 Lactate kinetics and individual anaerobic threshold.
 Stegmann H ; Kindermann W; Schnabel A
 International journal of sports medicine (GERMANY, WEST) Aug 1981, 2
 (3) p160-5, ISSN 0172-4622--Print Journal Code: 8008349
 Publishing Model Print

Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Other Citation Owner: NASA
Record type: MEDLINE; Completed
Subfile: INDEX MEDICUS; SPACE LIFE SCIENCES

Exercise with stepwise increasing work loads until exhaustion leads to a curvilinear increase of **lactate** in blood and typical **lactate** kinetics in the post-exercise period. **Lactate** kinetics in blood during exercise and recovery results from diffusion along gradients between muscle and blood and simultaneous elimination. Therefore, a general diffusion-elimination model is presented from which maximal rate of elimination (E_m), individual **anaerobic** threshold (IAT), gradient between muscle and blood ($\Delta C - \Delta C_{Em}$), muscle volume working above the IAT (V_m), individual membrane constant (M_c), quantity of **lactate** accounting for **lactate** gradient (A_{grad}), and whole body **lactate** (A_{net}) can be obtained. For demonstration purpose, this model was applied to a highly trained athlete. In this example, all constants and variables mentioned above as well as an equation reflecting individual **lactate** kinetics were calculated. Furthermore, the IAT was determined in 61 athletes participating in different events. In general, it can be demonstrated that with increasing aerobic capacity the **lactate** concentration at the IAT decreases. The **lactate** concentration at the IAT varies interindividually within broad limits, thus emphasizing the need for individual assessment.

Tags: Female; Male

Descriptors: *Exertion; *Lactates--blood--BL; *Models, Biological; Adolescent; Adult; Humans; Lactates--metabolism--ME; Muscles--metabolism--ME; Research Support, Non-U.S. Gov't; Work

CAS Registry No.: 0 (Lactates)

Record Date Created: 19820512

Record Date Completed: 19820512

6/9/4 (Item 4 from file: 155)

DIALOG(R)File 155:MEDLINE(R)

(c) format only 2006 Dialog. All rts. reserv.

05886288 PMID: 7129726

Hormonal and metabolic consequences of prolonged running at the individual anaerobic threshold.

Schnabel A; Kindermann W; Schmitt W M; Biro G; Stegmann H

International journal of sports medicine (GERMANY, WEST) Aug 1982, 3

(3) p163-8, ISSN 0172-4622--Print Journal Code: 8008349

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Subfile: INDEX MEDICUS

To examine the metabolic and hormonal responses to non-exhaustive steady-state exercise at the individual **anaerobic** threshold (IAT), 12 male physical education students performed treadmill exercise of 50 min duration. The treadmill speed equaled that at the IAT as assessed in a standardized progressive exercise test ($75 \pm 2\%$ of maximal oxygen uptake). Heart rate averaged $177.0 \pm 12.2 \text{ min}^{-1}$ at 15 min and $184.5 \pm 11.5 \text{ min}^{-1}$ at 50 min. After the initial adjustment, arterial **lactate** stabilized at individually different levels between 2.70 and 6.00 mmol/l

without any substantial trend in the individual curves. Arterial glucose was unchanged throughout the test. Glycerol increased continuously to 157% above the preexercise value (P less than 0.001). The FFA blood level was not depressed but rather showed an increasing tendency between 25 and 50 min (P less than 0.05). Between 0 and 25 min, insulin decreased (P less than 0.01), growth hormone increased to 8 times its pre-exercise value (P less than 0.001), and cortisol did not show any significant changes. Between 25 and 50 min, no significant additional changes were detected for these hormones. At 15 min epinephrine and norepinephrine had increased 2.8- and 7-fold above the respective pre-exercise values (P less than 0.001); both catecholamines continued to increase until 50 min (P less than 0.001 and P less than 0.01). It is concluded that prolonged exercise at the IAT is associated with a steady-state condition in carbohydrate supply and turnover, as is suggested by the stable blood levels of glucose and lactate. The stably elevated blood level of lactate did not result in depression of the FFA blood level, suggesting unimpaired supply of FFA from extramuscular sources. Exercise at the IAT places a high load on aerobic metabolism without encountering progressive lactate accumulation and the associated metabolic effects.

Descriptors: *Running; Adult; Anaerobiosis; Blood Glucose--metabolism--ME; Fatty Acids, Nonesterified--metabolism--ME; Hormones--metabolism--ME; Humans; Lipid Metabolism; Time Factors

CAS Registry No.: 0 (Blood Glucose); 0 (Fatty Acids, Nonesterified); 0 (Hormones)

Record Date Created: 19821218

Record Date Completed: 19821218

6/9/5 (Item 5 from file: 155)

DIALOG(R) File 155:MEDLINE(R)

(c) format only 2006 Dialog. All rts. reserv.

05839543 PMID: 7107102

Comparison of prolonged exercise tests at the individual anaerobic threshold and the fixed anaerobic threshold of 4 mmol.l(-1) lactate .

Stegmann H ; Kindermann W

International journal of sports medicine (GERMANY, WEST) May 1982, 3

(2) p105-10, ISSN 0172-4622--Print Journal Code: 8008349

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Subfile: INDEX MEDICUS

Prolonged physical exercise tests (50 min) at the threshold of 4 mmol . l-1 lactate (ATc) and at the individual anaerobic threshold (IAT) were applied in 19 rowing athletes. In each of the rowers (n = 19) work loads corresponding to the IAT did not result in a gradual lactase accumulation or exhaustion within 50 min of exercise. Means of lactate concentration and heart rate at the end of exercise were 4.0 +/- 1.6 mmol . l-1 and 182 +/- 13.0 beats . min-1, respectively. In 15 of 19 rowers, the IAT corresponded to lower work loads than the ATc. In these cases, prolonged exercise tests at the ATc showed gradual increases in lactate concentrations to a mean of 9.6 +/- 1.2 mmol . l-1, associated with exhaustion at a mean working time of 14.4 +/- 6.3 min and a mean heart rate of 192 +/- 10.4 beats . min-1. In four rowers, the IAT was found at identical (n = 3) or higher (n = 1) work loads than the ATc. In these

cases, after an initial increase no further rise in lactate concentrations in blood was observed, and exhaustion did not occur during the prolonged exercise tests. These findings support the conclusion derived from the lactate kinetics model that the IAT defines the work load at the maximal lactate steady state.

Tags: Female; Male

Descriptors: *Exertion; *Lactates--blood--BL; *Sports Medicine; Adolescent; Adult; Anaerobiosis; Comparative Study; Heart Rate; Humans; Oxygen Consumption; Physical Endurance; Research Support, Non-U.S. Gov't

CAS Registry No.: 0 (Lactates)

Record Date Created: 19821012

Record Date Completed: 19821012

6/7/1 (Item 1 from file: 434)

DIALOG(R)File 434:SciSearch(R) Cited Ref Sci

(c) 2006 The Thomson Corp. All rts. reserv.

04240463 Genuine Article#: MQ046 Number of References: 0

Title: INDIVIDUAL DETERMINATION OF THE ANAEROBIC THRESHOLD

Author(s): **STEGMANN H** ; KINDERMANN W

Corporate Source: UNIV SAARLAND, SPORT & LEISTUNGSMED ABT/D-6600
SAARBRUCKEN//FED REP GER/

Journal: INTERNATIONAL JOURNAL OF SPORTS MEDICINE, 1981, V2, N1, P62

Language: ENGLISH Document Type: MEETING ABSTRACT

6/7/6 (Item 6 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)

(c) 2006 The Thomson Corporation. All rts. reserv.

0013528907 BIOSIS NO.: 200200122418

Device and method for determination of the individual anaerobic threshold of a living organism

AUTHOR: **Stegmann H**

AUTHOR ADDRESS: Friedrich-Ebert Anlage 25, D-63411 Hanau, Germany**Germany

JOURNAL: Official Gazette of the United States Patent and Trademark Office
Patents 1212 (3): p2644 July 21, 1998 1998

MEDIUM: print

ISSN: 0098-1133

DOCUMENT TYPE: Patent

RECORD TYPE: Citation

LANGUAGE: English

6/7/7 (Item 7 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)

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0015846127 BIOSIS NO.: 200600191522

Method for determining the stress capacity of a person

AUTHOR: **Stegmann Heiner**

AUTHOR ADDRESS: 63450 Hanau, Germany**Germany

JOURNAL: Official Gazette of the United States Patent and Trademark Office
Patents MAY 31 2005 2005

ISSN: 0098-1133

DOCUMENT TYPE: Patent

RECORD TYPE: Abstract

LANGUAGE: English

ABSTRACT: The invention relates to a method for determining the stress capacity of a person taking into consideration the individual **anaerobic** threshold by measuring **lactate** concentrations in relation to physical effort. To make it possible to deduce from the changes in **lactate** concentration other performance data characteristic of the person tested, the invention provides for the following process steps: measurement of time-dependent **lactate** concentration changes above the individual **anaerobic** threshold; adjustment of the measurement curve, in which **lactate** concentration is recorded in relation to time, to the measurement values obtained in this way; determination of a first rise in the measurement curve at a time $t(IAT)$ which corresponds to the individual **anaerobic** threshold; determination of at least one other rise in the measurement curve at a time $t(x)$ where $t(x) > t(IAT)$ and subtraction of the second rise from the first rise to determine a difference ΔA .

[taken from the subject search:]

DIALOG(R) File 155:MEDLINE(R)

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05839543 PMID: 7107102

Comparison of prolonged exercise tests at the individual anaerobic threshold and the fixed anaerobic threshold of 4 mmol.l(-1) lactate.

Stegmann H; Kindermann W

International journal of sports medicine (GERMANY, WEST) May 1982, 3

(2) p105-10, ISSN 0172-4622--Print Journal Code: 8008349

Publishing Model Print

Document type: Journal Article

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Prolonged physical **exercise** tests (50 min) at the **threshold** of 4 mmol . l-1 **lactate** (ATc) and at the individual **anaerobic threshold** (IAT) were applied in 19 rowing athletes. In each of the rowers (n = 19) work loads corresponding to the IAT did not result in a gradual lactase **accumulation** or exhaustion within 50 min of **exercise** . Means of **lactate concentration** and heart **rate** at the end of **exercise** were 4.0 +/- 1.6 mmol . l-1 and 182 +/- 13.0 beats . min-1, respectively. In 15 of 19 rowers, the IAT corresponded to lower work loads than the ATc. In these cases, prolonged **exercise** tests at the ATc showed gradual increases in **lactate concentrations** to a mean of 9.6 +/- 1.2 mmol . l-1, associated with exhaustion at a mean working **time** of 14.4 +/- 6.3 min and a mean heart **rate** of 192 +/- 10.4 beats . min-1. In four rowers, the IAT was found at identical (n = 3) or higher (n = 1) work loads than the ATc. In these cases, after an initial increase no further rise in **lactate concentrations** in blood was observed, and exhaustion did not occur during the prolonged **exercise** tests. These findings support the conclusion derived from the **lactate kinetics model** that the IAT defines the work load at the maximal **lactate** steady state.

Record Date Created: 19821012

Record Date Completed: 19821012